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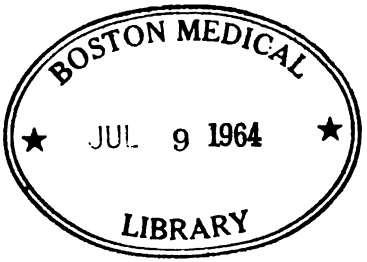
STATE BOARD EXAMINATION QUESTIONS — AND — ANSWERS

FOURTH EDITION



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STATE BOARD

EXAMINATION

QUESTIONS & ANSWERS

OF THE

United States and Canada

A PRACTICAL WORK GIVING AUTHENTIC QUESTIONS AND AUTHORITATIVE ANSWERS IN FULL THAT WILL PROVE HELPFUL IN PASSING STATE BOARD EXAMINATIONS. REPRINTED FROM THE MEDICAL RECORD

Fourth Edition

Thoroughly Revised
Every question answered in full

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State Medical Licensing Boards.

STATE BOARD EXAMINATION QUESTIONS.

Alabama State Board of Medical Examiners.

ANATOMY.

(For graduates of less than five years' standing.)

1. Describe the upper third of the femur.
2. Give the class of joint, the articulation, and ligaments of the shoulder joint.
3. Trace blood from the heart by way of the subclavian artery to the circle of Willis, naming the arteries uniting to form the circle.
4. Name the muscles of the anterior chest, and give origin and insertion of the largest one of them.
5. Name the main superficial venous trunks of the upper arm, describing one of them.
6. Describe the gall-bladder and the bile-ducts.
7. Describe the great sciatic nerve.
8. Describe the rectum.

(For graduates of more than five years' standing.)

1. Name the bones of the lower extremity.
2. Name and locate the valves of the heart.
3. Describe in full the sartorius muscle.
4. Locate the spleen and describe its gross anatomy.
5. Describe in full the pulmonary veins.
6. Describe the contents in Scarpa's triangle and give their relations.
7. Name the lobes and ventricles of the brain.
8. Name the ligaments supporting the uterus and describe its blood supply.

PHYSIOLOGY.

1. Explain the functions of the spinal cord.
2. What are the functions of the trifacial or fifth pair of cranial nerves?
3. What is meant by cell action? Give examples.
4. What are the supposed functions of the spleen?
5. What are the supposed functions of the thyroid gland? What symptoms sometimes follow its removal?
6. Explain the glycogenic function of the liver.
7. How is the equilibrium of the circulation of the blood maintained in the body?
8. What are the functions of the skin?

CHEMISTRY.

(Answer eight.)

1. What is the difference between analytic and synthetic methods in chemistry? Illustrate each.

2. Explain the reaction which occurs when the aqueous solutions of the two parts of a Seidlitz powder are mixed.
3. Write the equations which show the reaction occurring when corrosive sublimate and potassium iodide in solution are brought together.
4. What is the essential element of all acids? Differentiate between hydracids and oxyacids?
5. Give a test for H_2SO_4 when an adulterant in vinegar.
6. Give the technical names of (*a*) aqua regia, (*b*) oil of vitriol, (*c*) green vitriol, and the formula of one of them.
7. What is the chemical composition of ordinary alum?
8. Give the chemical reaction of (*a*) tears, (*b*) bile, (*c*) blood, (*d*) saliva, (*e*) milk, and state what salt causes acidity of urine.
9. Give a test for ferrous salts.
10. Explain the difference between a sulphate and a sulphite. Give an example of each.
11. Give tests for albumin and sugar in urine.
12. Describe a chemical test for blood.

PHYSICAL DIAGNOSIS.

1. In what pathological conditions of the lungs is moderate dullness found; in what is absolute dullness found?
2. Give differential diagnosis between acute bronchitis and lobar pneumonia.
3. What are the principal points of difference between pleuritic friction sounds and bronchial râles.
4. Give the diagnostic signs of aortic aneurysm.
5. What are the conditions most favorable for the production of metallic tinkle?
6. Give the differential diagnosis between endocarditis and pericarditis.
7. Give the diagnostic symptoms of emphysema of the lungs.
8. Differentiate between aortic stenosis and mitral insufficiency.

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY, AND DIAGNOSIS.

1. Give the etiology of cirrhosis of the liver.
2. Give the etiology of pyelitis.
3. Give the pathology of arterial sclerosis.
4. Give the symptoms and diagnosis of hookworm disease.
5. Give the differential diagnosis between pericarditis and acute pleurisy.
6. Give the pathology of cerebrospinal meningitis.
7. Give the etiology of erysipelas.
8. Give the pathology of pneumonia.

OBSTETRICS.

1. What is meant by the inclined planes of the pelvis?

2. What are the forces by which the child is expelled?
3. Give operation for adherent placenta.
4. Give mechanism of left occipitoposterior position.
5. How would you manage a shoulder presentation?
6. Give causes and treatment of asphyxia in a new-born child.
7. How would you apply forceps at the inferior strait when the occiput has rotated to the pubic symphysis?
8. Give the degrees of perineal laceration and management of each.

GYNECOLOGY.

1. Give causes and treatment of hemorrhage of the uterus.
2. Give the cause and treatment of amenorrhea.
3. Define ectopic pregnancy and give varieties.
4. Give differential diagnosis between fluid and solid neoplasms in the abdominal cavity.
5. Under what conditions and why would you prefer vaginal to abdominal hysterectomy?
6. Give symptoms of fibroid tumors of the uterus.
7. Give etiology of retrodisplacement of the uterus.
8. Describe the technique of a gynecologic examination.

SURGERY.

1. Give general rules for the treatment of wounds.
2. Give symptoms and treatment of traumatic spreading gangrene.
3. Give general rules for the treatment of tubercular abscesses.
4. Give differential diagnosis between chancre and chancroid.
5. Give treatment of a compound, comminuted fracture of the femur.
6. Give symptoms and treatment of subcoracoid dislocation of head of humerus.
7. Give symptoms and treatment of stone in the kidney.
8. Give treatment of penetrating gunshot wound of the abdomen.

EYE, EAR, NOSE, AND THROAT.

1. Give symptoms and management of acute catarrhal conjunctivitis.
2. Give the symptoms, dangers, and management of gonorrheal ophthalmia in the adult and in the new-born.
3. Give the management of ulcer of the cornea.
4. In what part of the ear does cerumen sometimes become impacted, and how diagnosed and treated?
5. What is the seat of acute suppurative otitis media, and what the symptoms, dangers, and management?
6. In the absence of the special instrument for the purpose how would you arrest an alarming hemorrhage from the nose?

7. What is the most conclusive symptom of diphtheria, and how ascertained? What is the most generally accepted treatment? Give in detail the method of administering the treatment, and the dose.

8. Name three instances in which intubation of the larynx would be indicated. Name three in which laryngotomy or laryngotracheotomy would be required, and describe the operation.

HYGIENE AND MEDICAL JURISPRUDENCE.

1. What is the period of incubation of smallpox? Of measles? Give the differential diagnosis between these two diseases.

2. What is immunity? What susceptibility?

3. How is typhoid fever disseminated? Give the hygienic management of a case.

4. Describe briefly the proper location and construction of a school building.

5. Define malpractice.

6. What are illusions? Delusions?

7. Give the differential diagnosis between strychnine poisoning and tetanic convulsions.

8. What are the symptoms of acute poisoning from coal tar derivatives?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

ALABAMA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

(For graduates of less than five years' standing.)

1. *The upper third of the femur* includes the head, neck, two trochanters, and upper part of the shaft. The head is a little more than half a sphere, and articulates with the acetabulum of the pelvis. The neck joins the head to the shaft at an angle of about 125°. The great trochanter is in a line with the external surface of the shaft. In front of it is a depression for the gluteus minimus. Internally, at the base is the digital fossa for attachment of the obturator externus. Above and in front of this are attached the obturator internus and gemelli. The lesser trochanter gives attachment to the ilio-psoas. The anterior intertrochanteric line separates the neck of the femur from the shaft.

2. The *shoulder joint* is an enarthrodial variety of a diarthrosis; it is formed by the head of the humerus being received into the glenoid cavity of the scapula; the liga-

ments are: Glenoid, capsular, coraco-humeral, and transverse humeral.

3. Heart, aorta (innominate, on right side only), subclavian, vertebral, basilar; then to posterior cerebral (which is part of Circle of Willis). This circle is formed: In front by the two anterior cerebral arteries (branches of the internal carotid), which are connected by the anterior communicating artery; behind, by the two posterior cerebrals (branches of the basilar artery), which are connected to the internal carotid on each side by the posterior communicating artery.

4. Muscles of anterior chest are: Pectoralis major, pectoralis minor, and subclavius. The largest of these is the pectoralis major. *Origin:* Anterior surface of inner half of clavicle, anterior surface of sternum, from the cartilages of the second to sixth ribs, and from the aponeurosis of the external oblique of the abdomen. *Insertion:* Into the outer bicipital ridge of the humerus.

5. *The main superficial venous trunks of the upper arm* are: The basilic and cephalic veins.

The basilic is formed by coalescence of anterior and posterior ulnar with the median basilic veins. Ascends on the inner side to middle of the arm, where it pierces deep fascia and joins brachial venæ comites to form axillary vein.

The cephalic passes up between deltoid and pectoralis major, perforates deep fascia and costo-coracoid sheath, and opens into the axillary vein. It is occasionally connected with the external jugular by a branch over the clavicle (jugulocephalic).

6. THE GALL-BLADDER AND BILE-DUCTS. The *gall-bladder* is a conical bag placed in a fossa on the under surface of the right lobe of the liver. Its upper surface is attached to the liver, and its fundus and posterior surfaces are invested by peritoneum reflected from the adjacent surface of the liver. The body is in relation in front with the liver, and behind with the first part of duodenum, the pylorus, and the hepatic flexure of colon. The fundus is in contact with the parietes opposite the ninth right costal cartilage.

The *hepatic duct,* formed by union of ducts from right and left lobes, issues from the liver at the bottom of the transverse fissure. It passes downward and to the right in the layers of gastrohepatic omentum, having the vena porta behind and the hepatic artery on the left. It joins the cystic duct, the two forming the common bile-duct.

The *cystic duct* passes from the neck to the gall-bladder downward, backward, and to the left, to join the preceding.

The *ductus communis choledochus* or *common bile-duct*

is the result of the union of the hepatic and cystic ducts. It passes behind the first part of the duodenum, in front of the vena portæ, with the hepatic artery on the left, between the layers of the gastrohepatic omentum, and, passing between the pancreas and second part of the duodenum, enters the small intestine obliquely a little below the middle of the descending part of the duodenum by an opening common to it and the pancreatic duct.—(From *Aids to Anatomy.*)

7. *The great sciatic nerve* arises from the sacral plexus, and passes out of the pelvis through the great sacrosciatic foramen, below the pyriformis muscle; it extends down the back of the thigh, passing between the great trochanter of the femur and the tuberosity of the ischium; at the lower third of the thigh it divides into the internal and external popliteal nerves. It supplies the hip-joint and the biceps, semitendinosus, semimembranosus, and adductor magnus *muscles.*

8. The *rectum* is the lowest part of the alimentary canal, and extends from the sigmoid flexure to the anus. It is about six inches in length, and is divided into three portions. The upper half only is invested with peritoneum. The upper third rests upon the sacral plexus and the pyriformis muscle; the middle third is in relation with the bladder, prostate, and seminal vesicles (in the female with uterus and vagina); the lower third is surrounded by the sphincters. It is not sacculated; the arteries are the hemorrhoidal branches of the inferior mesenteric, internal iliac, and internal pudic; the veins form the hemorrhoidal plexus, and empty into the inferior mesenteric and internal iliac veins.

(For graduates of more than five years' standing.)

1. Os innominatum (ilium, ischium, pubis), femur, patella, tibia, fibula, os calcis, astragalus, cuboid, scaphoid, three cuneiforms, five metatarsals, and fourteen phalanges.

2. In the *right auricle* are the Eustachian and coronary valves; the former is situated between the anterior margin of the inferior vena cava and the auriculo-ventricular orifice. In the *right ventricle* are the tricuspid and semilunar valves. In the *left ventricle* are the mitral and semilunar valves. Aortic valves, behind the third intercostal space, close to the left side of the sternum. Pulmonary valves, in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. Tricuspid valves, behind the middle of the sternum, about the level of the fourth costal cartilage. Mitral valves, behind the third intercostal space, about one inch to the left of the sternum.

3. SARTORIUS. *Origin:* Anterior superior spine of ilium,

and part of notch below. *Insertion:* Inner side of tibia near tubercle. *Nerve supply:* Middle cutaneous, or branch from anterior crural.

4. The *spleen* is situated in the back part of the left hypochondriac and epigastric regions, being covered by the ninth, tenth, and eleventh ribs, on the left side. It is of an oblong, flattened form, the external surface being convex; on the inner surface is a vertical ridge dividing it into two parts, the posterior of which is applied to the outer surface of the left kidney, while the anterior one receives the tail of the pancreas and lies against the cardiac end of the stomach. Near this ridge is a fissure, *the hilum*, where the vessels enter. The anterior border is notched and the lower end is pointed and rests on the costocolic ligament, situated in the left hypochondriac region. It is covered by peritoneum, except at the hilum, where it passes forward and inward in a double line enclosing the vessels, as the gastrosplenic omentum, to the fundus of the stomach. It usually measures 5 by 3 by 1 or 1½ inches, and weighs about 7 ounces.—(From *Aids to Anatomy.*)

5. The *pulmonary veins* are four in number. They commence in capillary network upon the pulmonary alveoli, uniting to form a trunk for each lobe; the one of the middle lobe of the right lung unites with the one from the superior lobe, hence there are two veins from each side. No valves. Carry *arterial* blood and empty into the left auricle, the left veins crossing the descending thoracic aorta.

Relations at the root of the lung:

FROM BEFORE BACK.	FROM ABOVE DOWN.	
	Right Side.	*Left Side.*
Vein.	Bronchus.	Artery.
Artery.	Artery.	Bronchus.
Bronchus.	Vein.	Vein.

—*(Pocket Gray.)*

6. *Contents:* The femoral vessels pass from about the center of the base to the apex, the artery being on the outer side of the vein; the artery gives off the superficial and profunda branches, and the vein receives the deep femoral and internal saphenous; the anterior crural nerve lies to the outer side of the femoral artery; the external cutaneous nerve is still further external, lying in the outer corner of the space; just to the outer side of the femoral artery, and in the sheath with it, is the crural branch of the genitocrural nerve. At the apex the vein (which at the base was internal to the artery) lies behind the artery. The triangle also contains fat and lymphatics.

7. *Lobes of brain:* Frontal, parietal, occipital, temporal, central (or island of Reil), limbic, olfactory, cuneate, orbital, precentral, postcentral, quadrate. *Ventricles:* Two lateral, third, fourth, and fifth.

8. *Ligaments of uterus:* Anterior, posterior, two broad (or lateral), two sacrouterine, and two round ligaments. *Blood supply:* Uterine and ovarian arteries and veins of same name.

PHYSIOLOGY.

1. *The functions of the spinal cord* are: (1) The conduction of nerve impulses; (2) reflex action; (3) coordination; it also contains special centers which preside over definite functions.

In the spinal cord: (*a*) The white substance simply conducts nerve impulses; (*b*) the gray substance contains groups of cells which act as centers for and distributors of nerve impulses, and are also concerned in reflexes; (*c*) the anterior cornua have a motor and trophic function; (*d*) the posterior cornua are sensory.

2. THE FUNCTIONS OF THE FIFTH CRANIAL NERVE. *First ophthalmic branch* supplies sensation to conjunctiva and skin of upper eyelid, cornea, skin of forehead and nose, lachrymal glands, mucous membrane of nose. *Second, or superior maxillary branch,* supplies sensation to skin and conjunctiva of lower lid, nose, cheek, upper lip, upper teeth and alveolar processes, and palate. *Third, or inferior maxillary branch,* supplies sensation to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower teeth, lower lip, and skin of the lower part of the face. This branch, in addition, supplies motion to the muscles of mastication (masseter, temporal, external pterygoid, internal pterygoid), also to mylohyoid and anterior belly of digastric.

3. By *cell action* is meant the function of cells, such as power of movement, of growth, of ingestion, of egestion, of reproduction, of secretion, of response to various stimuli.

4. The *function of the spleen:* The following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blood corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin.

5. The *function of the thyroid* is not definitely settled; (1) it has some trophic function, regulating oxidation in

the body, and it is supposed to have also a special influence on the vasomotor nerves, the skin, the bones, and on the sexual functions; (2) it is supposed to antagonize toxic substances, and (3) it produces an internal secretion.

Removal of the thyroid gland causes mental and bodily dullness and apathy, tremors, twitchings, overgrowth of the connective tissues, and development of fat; the hairs fall out and the patient becomes unwieldy and clumsy in both body and mind. The complete removal causes death in most animals, and it is not considered justifiable in man.

6. Glycogen is chiefly formed from the carbohydrates. The liver cells act upon the dextrose into which the carbohydrates have been converted by the action of the ptyalin and amylopsin of the digestive juices. This *may* occur by a simple process of dehydration:

$$C_6H_{12}O_6 - H_2O = C_6H_{10}O_5$$

But the precise process by which it occurs in the liver cells is not known.

At a subsequent period the glycogen is transformed into dextrose and is returned to the circulation. Hence the blood of the hepatic veins contains more sugar than the blood of the arteries, and these latter more than the blood in the veins (except the hepatic). This is the generally accepted view, but it is denied by Pavy, and the whole subject is in a state of uncertainty.

7. The circulation of the blood is regulated in (a) *the arteries* by: (1) The elasticity and tone of the arteries, (2) the force and frequency of the cardiac contractions, (3) the resistance in the capillaries; (b) in the *capillaries* it is regulated by (1) the action of the heart, (2) the action of the arteries; (c) in the *veins* it is regulated by (1) the action of the heart, (2) aspiration of the thorax, (3) the contraction of the muscles, and (4) slightly by the valves in the veins.

8. The functions of the skin are: Protection, sense of touch, excretion, regulation of body temperature, absorption, and respiration.

CHEMISTRY.

1. *Analytic methods* consist in breaking up a compound into its elements or into simpler compounds, as by acting on a carbonate with an acid we get water and carbon dioxide: $CaCO_3 + H_2SO_4 = CaSO_4 + H_2O + CO_2$.

Synthetic methods are the reverse of this, and consist in building up compounds out of simpler compounds or out of elements, as when $2H_2 + O_2 = 2H_2O$.

2. The monosodic carbonate is decomposed by the tartaric acid; sodium tartrate remains in the solution, and the liberated CO_2 causes the effervescence.

3. $HgCl_2 + 2KI = HgI_2 + 2KCl$.

4. Hydrogen is the essential element of all acids. *Hydracids* contain no oxygen; *oxyacids* contain oxygen as well as hydrogen.

5. Add cane sugar and evaporate; if the sugar turns black H_2SO_4 is present.

6.

	CHEMICAL NAME.	FORMULA.
(*a*) Aqua regia.	Nitrohydrochloric acid.	$HNO_3 + 3HCl$.
(*b*) Oil of vitriol.	Sulphuric acid.	H_2SO_4.
(*c*) Green vitriol.	Ferrous sulphate.	$FeSO_4$.

7. Ordinary alum is aluminium ammonium sulphate.

8. They are all alkaline. The acidity of the urine is due to monosodic phosphate.

9. *Ferrous salts,* on the addition of solution of potassium hydroxide, give a greenish-white precipitate, changing to green and then to reddish-brown, soluble in hydrochloric acid, but insoluble in ammonium hydroxide.

10. A *sulphate* is a salt of sulphuric acid, and contains more oxygen than a *sulphite,* which is a salt of sulphurous acid:

H_2SO_3	$CaSO_3$
Sulphurous acid	Calcium sulphite
H_2SO_4	$CaSO_4$
Sulphuric acid	Calcium sulphate

11. *Test for albumin in the urine:* "The urine must be perfectly clear. If not so, it is to be filtered, and if this does not render it transparent it is to be treated with a few drops of magnesia mixture and again filtered. The reaction is first observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline, it is rendered *faintly* acid by the addition of dilute acetic acid and heated. If albumin be present a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3."

For sugar: Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test-tubes. To one test-tube add a very minute

quantity of powdered subnitrate of bismuth; to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.

12. *Chemical test for blood:* Boil a fragment of dried blood with a drop of glacial acetic acid on a slide; on cooling, hemin crystals separate out. If the blood stain is not recent a crystal of sodium chloride should be added with the acetic acid.

PHYSICAL DIAGNOSIS.

1. *Moderate dullness* is found in: Consolidation of lung (in phthisis, pneumonia, gangrene, tumors), collapse of lung, congestion of lung, thickened pleura. *Absolute dullness* is found in: Hydrothorax or pleurisy with effusion, empyema.

2. *Acute bronchitis* begins with coryza; soreness and tenderness may be behind the sternum; pain may be caused by coughing; expectoration is abundant; dyspnea is in proportion to the extent of the disease; the pulse-respiration ratio is not altered; fever is slight or absent; various râles may be present; the condition is generally bilateral; ends by lysis.

Lobar pneumonia begins with rigors, sometimes also with vomiting; pain on affected side; expectoration is rusty and tenacious; breathing is very rapid; the pulse-respiration ratio is much disturbed; there is considerable fever; crepitant râles are heard in first stage, also in third stage (râle redux); usually only one side is affected; ends by crisis.

3. Râles are produced within bronchi or lungs, while friction sounds occur in the pleura and do not pass away after coughing. The creaking or crackling pleuritic friction is often mistaken for a crepitant râle, and Tyson gives the following distinguishing characteristics: The friction sound does not pass away after coughing, while the crepitant râle may do so; the friction sound is more superficial and localized, while the crepitant râle is deep and more diffuse; the friction sound has a to and fro movement during inspiration and expiration, while the crepitant râle is only heard at the end of inspiration; pleuritic friction sounds are generally heard in the axilla or side of the chest, while the crepitant râle is most frequently posterior, often at the base of the lung.—(From Gould and Pyle's *Cyclopedia.*)

4. *Aortic aneurysm (of the arch) may be diagnosed:*

	ASCENDING.	TRANSVERSE.	DESCENDING.
Physical signs.	Pulsation, often expansile, in second and third interspaces. On palpation systolic thrill and diastolic shock to right of sternum. Dullness to right of sternum, above cardiac area. Rough systolic murmur, loud clanging second sound. May have diastolic murmur from implication of aortic valve.	Pulsation in episternal notch. Systolic thrill in episternal notch. Dullness over manubrium sterni. Murmur more distinct over manubrium. Diastolic murmur rare.	Pulsation, if any, to left of spine. Absent. No dullness anteriorly, sometimes dull to left of spine. Murmur may be absent; when present systolic, to left of spine.
Parts liable to pressure and results of pressure.	Vena cava superior; dilated superficial veins, edema of head and neck. Innominate artery; weakness of right radial pulse. Heart; downward displacement of apex. Ribs to right of sternum; pain. Right bronchus; defective respiration on right side. Right recurrent laryngeal (rarely); paralysis of right vocal cord.	Left innominate vein; edema of left side of head and neck. Any branch of the arch; weakness of right or left radial pulse. Manubrium sterni; pain. Trachea or left bronchus; paroxysmal dyspnea, altered cough; defective respiration on left side. Left recurrent laryngeal; paralysis of left vocal cord. Sympathetic; dilatation or contraction of pupil, usually left. Esophagus; dysphagia.	Spinal colum, and ultimately cord; dorsal pain, afterward paraplegia. Left bronchus; defective respiration on left side. Left recurrent laryngeal; paralysis of left vocal cord. Left sympathetic (often); dilatation or contraction of left pupil. Esophagus; dysphagia. Thoracic duct; rapid emaciation sometimes chylous ascites.
Rupture may occur.	Externally. Into pericardium. Into right pleura. Into right bronchus. Into superior cava.	Into trachea. Into one or other pleura. Into left innominate.	Into left bronchus. Into left pleura Into esophagus.

(Wheeler and Jack's *Practice.*)

5. Pneumothorax, or cavity in the lung.

6. In *endocarditis:* The murmur is soft, not harsh; it is systolic or diastolic; it may be transmitted; it is heard loudest at definite points; it is not followed by signs of effusion; the apex beat may be strong.

In *pericarditis:* The murmur is harsh; is not in connection with the heart sounds, is heard loudest at the base of the heart and over the precordium; is followed by (or accompanied with) signs of effusion; the apex beat is generally feeble.

7. *Symptoms of emphysema of the lungs:* The disease is often not suspected until it is well developed. The chief symptoms of vesicular emphysema are difficulty of breathing (dyspnea), greatly aggravated on exertion; more or less cough, the result of an attending bronchitis, and the various symptoms resulting from dilatation of the heart, particularly cyanosis without marked distress. The discomfort of the patient is often increased by paroxysms of asthma.—(Hughes' *Practice of Medicine.*)

8. In *aortic stenosis* there is a systolic murmur, heard with greatest intensity at the junction of the second right intercostal cartilage with the sternum, and transmitted along the vessels.

In *mitral insufficiency* there is a systolic murmur, heard loudest at the apex, and transmitted into the left axilla, or under the left scapula.

ETIOLOGY, PATHOLOGY, SYMPTOMATOLOGY, AND DIAGNOSIS.

1. *Etiology of cirrhosis of liver:* Alcoholism, malaria, syphilis, irritation of the gall ducts, passive congestion of the liver.

2. *Etiology of pyelitis:* Cold, exposure, rheumatism, infectious diseases, obstruction of ureters, calculi, irritant drugs.

3. *Pathology of arterial sclerosis:* "The atheromatous changes are most frequent in the aorta. Rokitansky gives the relative order in which atheromatous degenerations occur as follows: aorta, splenic, femoral, iliac, coronary arteries of the heart, arteries of the brain, uterine, subclavian, brachial, ulnar, and radial arteries. The internal surface of the affected vesels is irregularly thickened with gelatinous and translucent, dense and fibrous, or calcareous deposits. If the calcification is extensive, the vessel is changed into a hard, stiff tube. Often the surface of the thickening or deposit is destroyed, presenting the so-called "atheromatous ulcers," which may be covered with masses of thrombi. The above conditions are the result of inflammatory change in the intima of the affected vessel which appears three or four times as thick as normal, due to the swelling of its elements, the new growth of connective

tissue, and the deposit of round cells. Fatty degeneration of the inflammatory products is the common sequence. The result of the changes in the arteries is a loss of elasticity, thus hindering the propulsion of the blood current and raising the arterial tension, ultimately leading to hypertrophy of the left ventricle. These changes finally involve the coronary arteries and lead to alterations in the myocardium. The nutrition of various other organs is likewise impaired when the intima of their respective arteries is involved in the degenerative process.—(Hughes' *Practice of Medicine.)*

4. *Hook-worm disease:* The worms or ova may be found in the stools (this is conclusive); anemia, epigastric uneasiness or pain, dizziness, languor, nausea, vomiting, shortness of breath, irregular fever, occult blood in the feces, icterus, dry skin, swollen ankles and feet, ascites, diarrhea or constipation, ground-itch.

5. In *pericarditis:* The friction sound is not affected by the patient holding his breath; the pulse is feeble; the pain is slight and is not affected by respiration. In *acute pleurisy:* The friction sound ceases when the patient holds his breath; the pulse is regular and strong; the pain is sharp and cutting, and is worse on inspiration.

6. *Pathology of cerebrospinal meningitis:* "In nearly all cases there is hyperemia of the membranes (pia and arachnoid) of the brain and spinal cord followed by an exudation of lymph and an effusion of serum most marked at the base of the brain. The cranial and spinal nerves are similarly affected in severe cases. The lungs, spleen, stomach, liver, kidneys, bladder, and muscles are in various stages of congestion and parenchymatous degenerations. In some cases death results from profound toxemia before structural changes have taken place. (Hughes' *Practice of Medicine.*)

7. *Pathology of Erysipelas:* The disease consists essentially of a septic inflammation of the skin and subcutaneous tissues, most frequently observed on the face and often directly traceable to some intranasal affection. Pyemic abscesses of the internal viscera may be found, as well as infarcts in the lungs, spleen, and kidneys.

8. *Pathology of lobar pneumonia:* "The most frequent seat of croupous pneumonia is the lower right lobe; the next most frequent seat is the lower left lobe; the next, the upper right lobe, although in children and the aged this lobe is affected equally as often as the right lower lobe.

"The changes are: I. *Hyperemia* (engorgement); II. *Exudation* (red hepatization); III. *Resolution* (gray hepatization); or the lung may undergo purulent transformation with the development of abscesses (yellow hepatization).

"I. *Stage of hyperemia,* or congestion, consists in distention of the vessel of the alveoli encroaching on the cavity of the air-vesicle; the lung has a reddish-brown color, is more resistant, and is heavier, sinking somewhat lower in water than a normal lung, and having a slight exudation upon the vesicular surface. The same changes are seen in the adjacent bronchioles.

"II. *Stage of exudation* consists in the exudation of a viscid, fibrinous fluid, mixed with white and red corpuscles and blood rapidly coagulating, firmly enclosing the corpuscles and completely filling the alveoli. When the exudation and coagulation are completed, the lung is red, sinks at once when placed in water, and its elasticity is destroyed. When cut, the color, density, and granular appearance so closely resemble the cut surface of a section of the liver that Laennec termed the condition *red hepatization.* A thin section shows under the microscope, as a rule, the lancet-shaped diplococcus of Fraenkel, as well as staphylococci and streptococci.

"III. *Resolution,* or *gray hepatization* follows in the majority of cases, the coagulated albuminous exudation undergoing liquefaction and absorption, the cellular element undergoing a fatty degeneration, the greater part being absorbed, the remainder expelled during acts of expectoration, the alveoli returning to their normal condition, as to capacity, function, and elasticity. The consolidated area softens and becomes mottled gray in appearance.

"If resolution be retarded and portions of the coagulated exudation undergo *purulent transformation* changing from a yellowish to a greenish-yellow color (*yellow hepatization*), pus cells are rapidly formed, the part becoming a granular, fatty mass. The portions of the lung not undergoing this purulent transformation retain the reddish color with intermixed yellowish patches. The purulent contents may be ejected in part, the remainder undergoing fatty degeneration and finally absorption." (Hughes' *Practice of Medicine.*)

OBSTETRICS.

1. *The inclined planes of the pelvis* are parts of the lateral walls of the long pelvis, made up of the body of the ischium and part of the ilium.

2. *Forces by which the child is expelled:* (1) Uterine contractions; (2) contractions of the diaphragm; (3) contractions of the abdominal muscles.

3. *For adherent placenta:* "The external genitalia should be most rigorously cleansed, the hands and forearms of the operator carefully disinfected, and rubber gloves employed. After grasping the uterus through the abdominal wall with one hand, the other, lubricated with sterile vase-

line, is introduced into the vagina and passed into the uterus, following the umbilical cord. As soon as the placenta is reached its margin should be sought for and the inner surface of the hand insinuated between it and the uterine wall. Then, with the back of the hand in contact with the latter, the placenta should be peeled off from its attachment by a motion similar to that employed in cutting the leaves of a book. After its complete separation the placenta should be grasped in the entire hand, but not extracted immediately, the operator waiting until the uterus contracts down firmly over the hand, which should then gradually be withdrawn." (Williams' *Obstetrics.*)

4. The *mechanism of left occipito posterior position* is either anterior rotation at the inlet, or at the outlet during descent, or on the perineum, or posterior rotation throughout.

5. In cases of ***shoulder presentation,*** if seen before labor, version should be performed to correct tne malpresentation; in case of impaction a cesarean section is indicated; sometimes decapitation or embryotomy has been performed, but a cesarean section is preferable. Cases of shoulder presentation have been known to terminate spontaneously, but it is not advisable to rely on this possibility.

6. *Asphyxia in a newborn child* may be caused by death of the mother, premature separation of the placenta, compression of the cord, pressure on the fetus by forceps, prolonged labor, etc. Treatment consists in vigorous slapping, with one of the methods of artificial respiration.

7. "Before applying the instruments they should be sterilized, preferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the labia; the tip is introduced into the vagina, passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades must be rotated forward. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps." *(Pocket Cyclopedia of Medicine.)*

8. "Injuries to the perineum are almost invariably the result of childbirth. They are classified, according to the extent and position of the injury, into: (1) Slight median tear not involving the anal sphincter; (2) median tear in which the sphincter is divided; (3) laceration in one or

both vaginal sulci; and (4) subcutaneous laceration of the muscles and fascia. The treatment consists in an operation known as *perineorrhaphy*, in which the lacerated structures are brought in apposition and maintained there by shotted silkworm-gut sutures. Primary perineorrhaphy consists in repair of the injury during the first few hours after labor, and is advised when possible, because later it is necessary to freshen the edges of the wound before introducing the sutures." (*Pocket Cyclopedia.*)

GYNECOLOGY.

1. The following (from Gould and Pyle's *Cyclopedia of Medicine and Surgery*) is a useful classification of uterine hemorrhages, and also gives the causes of the same:

I. *Hemorrhages complicating pregnancy, labor, or the puerperium:*

A. Hemorrhages of pregnancy: Caused by (1) placenta prævia; (2) premature separation of a normally situated placenta; (3) apoplexy of the decidua or placenta.

B. Hemorrhages of labor: Caused by (1) placenta prævia; (2) premature separation of a normally situated placenta; (3) relaxation of the uterus; (4) laceration of the cervix; (5) rupture or inversion of the uterus.

C. Hemorrhages of the puerperium: Caused by (1) retained secundines; (2) displaced uterus; (3) displaced thrombi; (4) fibroid tumors; (5) hypertrophied decidua; (6) carcinoma.

II. *Hemorrhages occurring in the non-pregnant woman:*

A. In virgins before the age of thirty: Caused by (1) uterine congestion, the result of cold or exposure; (2) endometritis; (3) polypi and fibroid tumors.

B. In married women before the age of thirty: Caused by (1) subinvolution; (2) laceration of the cervix; (3) endometritis; (4) retrodisplacements of the uterus; (5) polypi and fibroid tumors.

C. In women after the age of thirty: Caused by (1) carcinoma of the cervix; (2) carcinoma of the body of the uterus; (3) sarcoma of the uterus.

The *treatment* depends on the cause. For details see any work on obstetrics or gynecology.

2. *Amenorrhea* may be *due* to: Absence or imperfect development of the generative organs; also to stenosis, obstructions, or atresia of the genital tract; also to operative removal of the uterus or its appendages. Other causative factors are: Acute infectious diseases, anemia, chlorosis, obesity, drug habits, alcoholism, overstudy, lack of exercise, exposure to cold, and various emotional causes. Pregnancy or lactation may be the cause.

Treatment consists in: Removing or treating the cause.

3. *Ectopic pregnancy* is a pregnancy in which the product

of conception is not inside the uterine cavity. *Varieties:* Tubal, ovarian, interstitial, abdominal.

4. "The consistency of a tumor is ascertained by palpating it in all directions between the fingers of both hands and by tapping it to determine the absence or presence of fluctuation. The left hand is placed firmly over the abdomen on one side of the tumor and the fingers of the other hand strike or tap the abdominal wall on the opposite side; if fluid is present a thrill or wave is detected. The fluctuation wave, however, may be absent in multilocular cysts and in tumors having thick, tense walls or viscid contents. The length and intensity of the thrill over different parts of an abdominal enlargement are of great diagnostic value in many instances. Thus, in ascites and unilocular cysts there is no variation in the character of the wave, whereas in a multilocular tumor it differs as to length and intensity over different parts of the growth. In obese women the fat contained in the belly walls causes false wave or thrill when the abdomen is tapped, which may be mistaken at times for the presence of fluid. To eliminate this factor an assistant places the ulnar edge of his hand firmly on the abdominal wall in the median line, while the examiner taps the abdomen in the usual manner."—(From Ashton's *Gynecology.*)

5. As to preference between the vaginal and abdominal routes, the following is taken from Garrigues' *Gynecology:* "If the vaginal route is available it should be preferred, because it entails much less shock, requires a simple after-treatment, does not leave any visible cicatrix, predisposes less to hernia, and allows the patient to resume work in shorter time. On the other hand, the vaginal route is more difficult on account of the limited space. Hemorrhage is more troublesome to check, adhesions are harder to separate, and the bladder and intestine more exposed to injury and less accessible for repair. The pelvic cavity cannot be seen so well and the abdominal not at all. If tissue is left to mortify it emits an offensive odor."

6. *Symptoms of fibroids:* Hemorrhage, leucorrhea, pain, pressure symptoms (disturbances and displacements of bladder, rectum, urethra, and uterus), backache, bearing-down sensation, dysmenorrhea.

7. RETROVERSION. *Etiology:* Relaxation of uterine ligaments; increased weight of fundus; subinvolution; ovarian or other tumor pressing on front of uterus; distended bladder; peritonitis or cystitis; prolonged dorsal decubitus and tight bandaging in the puerperium.

RETROFLEXION. *Etiology:* Tight lacing and tight clothing; congenital conditions; pressure by tumors; metrititis and parametritis with adhesions; atonic conditions of the uterus following labor, and the conditions that cause retroversion.

8. A complete gynecological examination would include (1) anamnesis, including family history; personal history, with special reference to menstruation, labors, and miscarriages, and present illness. (2) Examination of the abdomen (and breasts), including inspection, palpation, percussion, auscultation, and menstruation. (3) Inspection of the external genitals. (4) Vaginal examination, digital, bimanual, and with speculum. (5) Bimanual examination of uterus and appendages. (6) Sometimes the sound, or curette, may be required. (7) Chemical and microscopical examination of the urine. (8) Microscopical examination of discharges or uterine scrapings. (9) Rectal examination. (10) Cystoscopic examination and perhaps ureteral catheterization. (11) In case of phantom tumor or pseudocyesis, anesthetization would be required.

SURGERY.

1. *The general rules for treatment of wounds:* Stop the bleeding; remove foreign bodies; make as aseptic as possible; coapt the edges; drain when necessary; dress, and secure rest to the part; bring about reaction; ease pain.

2. *Acute traumatic gangrene* "is due to infection of wounds with the *bacillus of malignant œdema,* or the *Bacillus aërogenes capsulatus.* It occurs especially in wounds soiled with earth.

Symptoms begin about two days after the accident. Inflammation spreads rapidly along the planes of connective tissue. The limb is purple and brawny, soon becomes gangrenous, and the tissues crepitate from the gas formed by the organisms. There is high temperature and delirium, and death occurs in about three to five days.

Treatment — Prophylaxis. — All wounds soiled with earth should be thoroughly purified at once.

When the disease is established, amputation well above the diseased area offers the only chance, and a poor one even then. Stimulants and a generous diet must be given." *(Aids to Surgery.)*

3. "The *treatment* of chronic abscess consists in removal of the cause whenever possible (necrotic bone, tuberculous lymph glands, etc.) In cases in which the cause is not known, the best treatment is *incision* under scrupulous antiseptic precautions, and exploration to determine, if possible, the cause and to remove it. After removal of the granulations with a curette, the cavity should be thoroughly irrigated, and packed with iodoform gauze. If the abscess is so large that its limits cannot be reached, or if the cause cannot be removed, the incision may be *sutured,* in order to escape the risk of secondary infection during the subsequent dressings. In cases in which the abscess is small, particularly when connected with a lymphatic

gland, *excision* of the whole abscess cavity and suture of the wound is indicated. Simple *aspiration* is occasionally followed by healing. *Tapping, and irrigation* with a weak antiseptic solution has also been recommended, and is successful in exceptional cases. Tapping and irrigation, followed by the injection of *iodoform emulsion* (10 per cent. in glycerin or olive oil), also is used, and favorable results have been reported. These methods, however, do not permit exploration, or removal of the granulation tissue or causative lesion, and are, therefore, indicated in but few cases. There is some danger of iodoform poisoning in the last method. Not more than 4 or 5 drams should be used in an adult, and not more than 2 or 3 drams in a child. Ethereal emulsions become gaseous after injection, and in certain regions may produce harmful pressure. The *constitutional treatment* consists of nourishing food, fresh air, cod-liver oil, and tonics; it may be necessary to adjust apparatus if the abscess proceed from bones or joints." (Stewart's *Surgery*.)

4.

CHANCRE.	CHANCROID.
First lesion of a constitutional disease, viz., syphilis.	A local disease.
Due to syphilitic infection.	Due to contact with secretion from chancroid.
Generally a venereal infection.	Always a venereal infection.
May occur anywhere on the body.	Nearly always on genitals.
Period of incubation never so short as ten days.	Period of incubation always less than ten days (generally about three).
Generally single.	Generally multiple.
Not autoinoculable.	Autoinoculable.
Secretion slight.	Secretion profuse and purulent.
Slightly or not at all painful.	Generally painful.
As a rule only occurs once in any patient.	May reoccur in same patient.
Buboes are painless and seldom suppurate.	Buboes are painful and usually suppurate.

5. Anesthetize. Disinfect as thoroughly as possible, and especially do this to any protruding fragment before reduction. Remove crushed tags of skin and comminuted bone fragments. Wire the fragments when retention of position is difficult otherwise. Drain the wound with gauze or tube. Place in splints. (Groves.)

6. In subcoracoid dislocation, the head of the bone lies below the coracoid process upon the neck of the scapula. The tendon of the subscapularis is torn or stretched over the neck of the humerus. The supraspinatus, infraspinatus, and teres minor are either tightly stretched, producing external rotation, or torn (sometimes with great tuberosity), with internal rotation. There will be found: Local contusion; restricted mobility; flattened outer border of shoulder; head of the bone is felt below outer end of clavicle; elbow is displaced from the side outward and backward, and cannot touch the chest wall when the hand is placed on the opposite shoulder; there is little or no shortening. *Treatment:* Kocher's method: Anesthetize. Elbow is held to the side. Hand is brought forward and outward, so as to externally rotate the humerus and relax the external rotators. Elbow is adducted to the mid-line—this makes the margins of the gap in the capsule tense. Elbow is raised, so as to slacken upper margin of the rent and keep lower tense. Hand is placed on the opposite shoulder, i. e., arm is rotated inward, to make the head of the humerus slip into capsule. Elbow lowered. (Groves' *Synopsis of Surgery.)*

7. STONE IN THE KIDNEY. Symptoms consist of pain in the loins, markedly increased by exercise, especially on jolting. The pain may be referred to the thigh, groin or testicle. The colic is associated with hematuria, and often pyuria exists with frequency of micturition. The kidney may be enlarged, and tender on pressure. A large stone may exist without any symptom whatever. The most typical symptom consists in a sudden attack of excruciating and paroxysmal pain shooting down the loin to the bladder and testis. The attack is accompanied by vomiting, faintness, and collapse. Frequent efforts to pass urine are made, but only a scanty amount of blood-stained urine is passed. The pain ceases suddenly when the calculus slips back into the pelvis or reaches the bladder.

Treatment—Palliative.—The patient's diet must be regulated so that there is no excess; plenty of fluid should be taken as well as proper exercise. Alkaline purgatives and urotropin should be ordered. Sometimes under this treatment a small stone becomes encysted, but it is unlikely that a stone once formed will be dissolved. Renal colic is treated by hot baths, ½ grain of morphine, or chloroform, to relieve the pain.

Operative Treatment is adopted if the above means fail, if a perinephric abscess forms, or a stone is impacted in the ureter. Nephrolithotomy is the ideal operation, but if the kidney is converted into a mere abscess cavity nephrectomy is necessary. Nephrectomy should not be done if it is suspected that the other kidney is also affected. *(Aids to Surgery.)*

8. In civil practice it is best to explore the wound after disinfecting the abdomen. If the peritoneal cavity has been penetrated, open in the mid line or by enlarging the wound of entry, and deal with visceral lesions.

In military practice an expectant treatment (the abdomen not being opened unless definite symptoms of hemorrhage or visceral lesions have arisen) has given the best results. (Groves.)

EYE, EAR, NOSE, AND THROAT.

1. ACUTE CATARRHAL CONJUNCTIVITIS. *Symptoms:* Hyperemia, profuse lacrymation, epiphora, a profuse discharge, sensation of sand in the eye, and sometimes photophobia. *Treatment:* Astringent and antiseptic washes are of value. Ascertain the underlying cause, if possible, and remove it. Anointing the lids with pure or medicated vaseline every evening is necessary. Alum, tannic acid, silver nitrate, and zinc sulphate are valuable as astringents. In intractable cases a 50 per cent. solution of boroglycerid in glycerin should be applied once daily.—(Gould and Pyle's *Cyclopedia.*)

2. GONORRHEAL OPHTHALMIA. *Symptoms:* Swelling and redness of the eyes, the presence of a discharge which soon becomes purulent, the conjunctiva of the lids becomes thickened, the eyelids are edematous, pain is severe, and there is some fever. *Dangers*: Ulceration and sloughing of the cornea, perforation of the anterior chamber, and blindness. *Management:* Protect the sound eye. Wash the eye carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped onto the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burnt. In adults the irrigation must be frequent, about every half hour or hour.

3. *Management of corneal ulcer:* The treatment consists in putting the eye at rest, instilling atropin, and the application of a bandage. Leeches to the temple will relieve the pain. Hot compresses have the same effect. The eye should be douched with sublimate solution, 1:5000, and iodoform dusted upon the cornea. Stronger sublimate solution, boroglycerid 50 per cent., and formalin 10 per cent. are sometimes necessary. Cauterization is occasionally indicated. If perforation seems probable, it should be hastened by a puncture.—(Gould and Pyle's *Cyclopedia.*)

4. Cerumen may become impacted in the external auditory canal. It may cause deafness, tinnitus, giddiness, cough; it is diagnosed by being seen (with the aid of an ear speculum). Syringing with warm water containing

sodium bicarbonate and glycerin; if near the orifice, it may be removed with a spud.

5. In *acute suppurative otitis media:* Pain (lessened when drum perforates), fever (100° to 104° F.), tinnitus, deafness (usually partial only), and purulent discharge (after perforation). *Treatment:* Dry heat allays the pain. Warmed water or warmed carbolic acid solution (1:40) may be used. Inflations, aspirations, etc., should be avoided. If the nares are filled with tough secretions, a spray of Dobell's solution may be used. If the pain continues over six hours in a child or over twelve hours in an adult without spontaneous perforation of the tympanic membrane, paracentesis of that structure should be performed. The concha and meatus should be smeared with petrolatum to avoid chapping, and the secretions should be gently mopped off as they appear. Under this treatment the ear usually returns to normal in two to three weeks."—(Gould and Pyle's *Pocket Cyclopedia of Medicine and Surgery.*)

6. *To arrest epistaxis:* (1) Try to cauterize the bleeding point; (2) plug the nasal cavity with gauze soaked in adrenalin; (3) inject into the nares a solution of peroxide of hydrogen; (4) plug the nares, anteriorly and posteriorly; (5) an inflating plug may be used.

7. The most conclusive evidence of diphtheria is the finding of the Klebs-Loeffler bacillus.

A sterile swab is rubbed over any visible membrane on the tonsils or throat, and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appear as short, thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts.

The most generally accepted treatment is the administration of antitoxin. The serum is injected into the subcutaneous cellular tissue of the abdomen, shoulder, loins or buttocks. From 1500 to 2000 units are generally given as the first dose; but in severe cases 3,000 to 5,000 units may be given; this can be repeated in from six to twelve hours if necessary.

8. ***Intubation is indicated*** in: Diphtheria, edema of glottis, and laryngeal obstruction. ***Laryngotomy*** in: Spasm of glottis, foreign body in the larynx, and dyspnea due to some sudden obstruction.

Laryngotomy is performed as follows: Make an incision an inch and a quarter in length in the middle line, from above the lower edge of the thyroid to below the lower border of the cricoid cartilage. Divide the skin, superficial fascia, and deep fascia, separate the cricothyroid and sternothyroid muscles, divide the deep layer of fascia, and cut the cricothyroid membrane horizontally just above the cricoid cartilage. The tube must be shorter than the ordinary tracheotomy tube. (Da Costa.)

HYGIENE AND MEDICAL JURISPRUDENCE.

In *smallpox:* The eruption usually appears first on the forehead and wrists, and on the third or fourth day; it is first mascular, then papular, then vesicular, and finally pustular; it does not appear in successive crops; the spots are multilocular, and do not collapse on being punctured; the papule is hard and shotty, and does not disappear on stretching the skin. Period of incubation is from eight to fourteen days. *Measles:* Period of incubation, ten to twelve days. Stage of invasion, four days. Character of eruption, small, dark red papules with crescentic borders, beginning on face and rapidly spreading over the entire body; desquamation is branny. The eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower, the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present.

2. ***Immunity*** is the ability of a tissue or organism to resist infection. The absence or loss of this defensive power against infection is called ***susceptibility.***

3. The sources of contagion in typhoid fever are food, milk, water, fingers, and flies, or anything that has been in contact with the excreta of a typhoid patient.

Typhoid fever is preventable. When the municipal authorities do not consider it their duty to supply pure water, each household should boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food; flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others should wash their hands in a disinfectant; thorough ster-

ilization of all bedding, etc., must be performed after the disease is over.

4. The school building should be as near as possible to the center of the area which it is to serve; the site should be airy and open, of sufficient size, and somewhat elevated; it should not be too near factories, busy streets, or railways; the soil should be as free as possible from organic matter. The building should be so planned that the corners look towards the four points of the compass. In this way the sun will have access to each side and to every room during some part of the day. The building should have as few stories as possible. The walls should be of brick or stone, and should be pointed with cement; the inner surface of the wall should be cemented smooth. The foundations must be solid. The general arrangement will depend upon size of site, number of scholars, and number of required rooms. Fifteen square feet per child should be allowed. Details will have to be considered on: plans, accommodations to be provided, shape and size of class rooms, distribution of rooms, teachers' rooms, corridors, entrances and staircases, playground, ventilation, heating, lighting, and placing of windows, sanitation, la atories, water supply, drinking water, sewage disposal, removal of refuse, sanitary appliances, and drainage.

5. *Malpractice* is a failure on the part of a medical practitioner to use such skill, care, and judgment in the treatment of a patient as the law requires; and thereby the patient suffers damage. If due to negligence only, it is *civil malpractice.* But if done deliberately, or wrongfully, or if gross carelessness or neglect have been shown, or if some illegal operation (such as criminal abortion) be performed, it is *criminal malpractice.*

6. A *delusion* is a belief in something which has no real existence, but is purely imaginary; and out of which the person cannot be reasoned. An *illusion* is a false or perverted impression, received through one of the senses.

7. In *tetanus,* the onset is gradual, is apt to begin with trismus, swallowing is difficult or impossible, the condition is persistent, consciousness is dulled or lost, and there is history of a wound or injury. In *strychnine poisoning* the onset is more sudden, the muscles of the jaw and neck are generally the last to be affected, there are marked remissions with muscular relaxation, consciousness is retained, and there is no history of a wound or injury.

8. The symptoms of acute poisoning by coal tar derivatives are given by Riley as follows: After a full toxic dose there soon follows a sense of chilliness and, especially in the case of antipyrin, nausea, and vomiting. The skin becomes cyanosed and covered with cold perspiration. The

pulse becomes soft, slow, and weak, and the respirations slow and shallow, death usually resulting from respiratory paralysis. Occasionally paroxysms of sneezing have been observed.

STATE BOARD EXAMINATION QUESTIONS.

ARKANSAS STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. At what time in the development of the fetus is the hair formed?
2. Give the general classification of bones.
3. Name the bones of the upper extremity.
4. Describe the diaphragm, giving origin, insertion, nerve supply, and action.
5. Name the superficial group of the muscles of the abdomen.
6. Name the openings of the heart.
7. Name the branches of the anterior tibial artery.
8. Describe the pia-mater.
9. Describe the uterus.
10. Describe the gall-bladder.

PHYSIOLOGY.

1. Name and describe the glands of the intestines and tell in which portion of the intestine each kind is situated.
2. Describe the glycogenic function of the liver and tell the destination of glycogen.
3. Give origin, distribution, and function of the fifth pair of cranial nerves.
4. (a) How is the nervous system arranged anatomically? (b) Give a short sketch of each system.
5. How many pairs of spinal nerves are there? Describe them.

CHEMISTRY.

1. What is albumin?
2. In what form in nature do we find albumin in its purest form?
3. In what case of poisoning do we use albumin as an antidote?
4. Name a metallic poison for which albumin is especially recommended.
5. What is meant by toxicology?
6. What causes the decay of animal or vegetable matter when deprived of life?
7. What is meant by ptomain poison?
8. What is the origin of ptomain poison, or, in other words, how and from what are ptomains derived?

9. When the atmosphere we live in becomes charged with an excess of carbonic acid, how is it purified and made fit for the support of animal life?

MATERIA MEDICA AND THERAPEUTICS.

1. What is an alkaloid, a tincture, a fluid extract?
2. Name four different classes of medicine, with an example of each class. Give dose of example.
3. What drugs would you use hypodermatically to meet the following requirements? (a) To stimulate the heart's action; (b) to produce emesis; (c) to control hemorrhage.
4. What is the strength of normal salt solution? Give indications for its use and mode of administration.
5. Give principal alkaloid of belladonna and indications for its use; also dose.
6. Name the three (3) most used preparations of opium, and how much of each contains one grain of opium.
7. Give hypodermatic dose of the following: Sulphate of strychnine, sulphate of atropine, sulphate of morphine, apomorphin hydrochlorate, nitroglycerin, and pilocarpine hydrochlorate.
8. Write a complete prescription for a diuretic containing not less than three ingredients
9. How are the cathartic effects produced by salines?
10. How is nitrite of amyl used, and for what purpose?

PRACTICE.

1. Differentiate between acute alcoholism and apoplexy.
2. Give etiology, physical signs, and treatment of pericarditis.
3. Give physical signs of acute lobar pneumonia.
4. Give etiology, diagnosis, and treatment of biliary colic.
5. What are the two common complications of typhoid fever during the second or third week? and give treatment.
6. Describe a case of acute catarrhal dysentery and give treatment.
7. Give etiology, diagnosis, and treatment of gonorrhea.
8. Give diagnosis and treatment of acute articular rheumatism.
9. Give etiology, morbid anatomy, period of measles incubation, common complications and their treatment.
10. Describe three stages of malarial paroxysm and give treatment in each stage.

SURGERY.

1. Describe symptoms and operation for gallstones.
2. Through what would you pass, in the open method of operating for hydrocele?

3. What are the contraindications for hemorrhoidal operation?
4. How would you differentiate between gallstones, gastric ulcer, and appendicitis?
5. Give surgical treatment for Bright's disease.

OBSTETRICS.

1. Describe the Fallopian tubes.
2. Describe the placenta and give its functions.
3. Give differential diagnosis of pregnancy from ovarian cystoma.
4. Give treatment for threatened abortion.
5. Write prescription for vaginitis.
6. Give treatment for placenta prævia.
7. What are the indications for vaginal tamponing?
8. Give method of performing cephalic version.
9. Give treatment of uterine inertia.
10. Give management of normal labor.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

ARKANSAS STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Hair begins to develop at about the third month of fetal life.
2. Bones are classified as: (1) Long, (2) short, (3) flat, and (4) irregular bones.
3. Scapula, clavicle, humerus, ulna, radius, carpal (scaphoid, semilunar, cuneiform, pisiform, trapezium, trapezoid, os magnum, unciform), five metacarpals, and fourteen phalanges.
4. The *diaphragm* is a musculofibrous septum which divides the thoracic from the abdominal cavity; it is fan-shaped; the broad, elliptical portion is horizontal, and the crura are vertical. It is attached to the ensiform, to the internal surfaces of the lower six costal cartilages, to bodies and intervertebral substances of first, scond, and third lumbar vertebræ. Its *openings* are: (1) The aortic, (2) the esophageal, (3) the opening for the vena cava, (4) the right crural, (5) the left crural. *Nerve supply:* Phrenic, lower intercostal, and sympathetic. *Action:* It is the chief inspiratory muscle; also used in all expulsive efforts (laughing, sneezing, coughing, crying, vomiting, urination, defecation, and parturition).
5. External oblique, internal oblique, transversalis, rectus, pyramidalis.
6. Openings of superior vena cava, of inferior vena cava, of coronary sinus, of foramina of Thebesius, right auriculo-

ventricular, of pulmonary veins, left auriculo-ventricular, of pulmonary artery, and of aorta.

7. Anterior and posterior recurrent tibial, superior fibular, muscular, external, and internal malleolar.

8. "The *Pia Mater of the brain* consists of a delicate stroma supporting bloodvessels, and closely invests the brain, dipping into the sulci. At the transverse fissure it is prolonged into the lateral ventricles and over the 3rd ventricle, pushing the endothelial lining of those cavities in front of it, and forming the *velum interpositum* and choroid plexuses of the lateral and 3rd ventricles. It is prolonged over the roof of the 4th ventricle, sending inward two vascular fringes, the choroid plexuses of that cavity.

"The *Pia Mater of the cord* is less vascular, thicker, and more fibrous than that investing the brain. It has an external fibrous layer of longitudinal bundles having a fold, the *linea splendens,* dipping into the anterior fissure, and a smaller one passing into the posterior fissure. The pia mater ends in a slender cord, the *filum terminale,* which is within the prolongation of the dura mater. A process of pia mater, the *ligamentum denticulatum,* passes outward toward the dura, to which it is attached by twenty-two tooth-like processes situated between the origins of the spinal nerves; its pial origin is continuous, and lies between the anterior and posterior nerve-roots." *(Aids to Anatomy.)*

9. In the nulliparous adult the uterus is about three inches long, about two inches wide at the upper part, and about one inch thick. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity, and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments. (1) *Broad ligaments,* which extend outward on each side from the side of the uterus to the side of pelvis. (2) *Rectouterine ligaments,* which extend backward from the intraperitoneal portion of the cervix uteri to the peritoneal investment of the rectum. (3) *Round ligaments,* which extend from the uterus just below the Fallopian tubes, through the inguinal canal to the labia majora. (4) The *ovarian ligaments,* which extend from the superior part of the uterus, behind the Fallopian tubes, to the inner end of the ovary. (5) The *uterosacral ligaments,* which extend from the highest part of the cervix uteri to the sides of the sacrum opposite the lower border of the sacroiliac synchrondrosis.

10. The *gall-bladder* is placed in a fossa on the under

surface of the right lobe of the liver. Its upper surface is attached to the liver, and its fundus and posterior surfaces are invested by peritoneum reflected from the adjacent surface of the liver. The body is in relation in front with the liver, and behind with the first part of duodenum, the pylorus, and the hepatic flexure of colon. The fundus is in contact with the parietes opposite the ninth right costal cartilage.

PHYSIOLOGY.

1. Lieberkühn's glands are found throughout the small and large intestine; Brunner's glands are found in the duodenum; the solitary glands are found throughout the entire intestine, but are most abundant in the lower part of the ileum and the upper part of the large intestine; Peyer's patches are found in the lower two-thirds of the small intestine, chiefly in the ileum.

2. Glycogen is chiefly formed from the carbohydrates. The liver cells act upon the dextrose into which the carbohydrates have been converted by the action of the ptyalin and amylopsin. This may occur by dehydration, but the exact process is not known. At a subsequent period the glycogen is transformed into dextrose and is returned to the circulation. Hence the blood of the hepatic veins contains more sugar than the blood of the arteries, and these latter more than the blood in the veins (except the hepatic). It is the generally accepted view, but it is denied by Pavy, and the whole subject is in a state of uncertainty.

The destination of glycogen: It is converted into sugar (dextrose), is given off to the blood, and is finally oxidized in the tissues.

3. FIFTH PAIR OF CRANIAL NERVES. *Origin: Superficial,* from side of pons Varolii; *deep,* from medulla, and floor of fourth ventricle. *Distribution and Functions: First,* ophthalmic; sensory to anterior half of scalp, conjunctiva, and skin of upper eyelid, cornea, skin of nose, mucous membrane of nose, lacrymal gland. *Second,* superior maxillary; sensory to conjunctiva and skin of lower eyelid, nose, cheek, upper lip, palate, upper teeth, and alveolar processes. *Third,* inferior maxillary; sensory to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower lip, teeth and alveolar processes of lower jaw. It is also motor to the muscles of mastication (temporal, masseter, two pterygoids), mylohyoid, and anterior belly of the digastric.

4. The nervous system is divided into—

1. The Cerebrospinal system.
2. The Symphathetic system.

"1. The CEREBROSPINAL includes the brain, spinal cord.

Ueber-Cure

certain ganglia, motor and sensory nerves. The motor nerves are supplied to the striated or voluntary muscles; the sensory are distributed to the organs of sense, skin, and other parts endowed with sensibility. The nerve-fibers are mostly of the medullated kind.

"2. The SYMPATHETIC consists of a series of ganglia and nerves, which supply the involuntary muscular fiber of the uterus, stomach, intestines, ducts, and blood-vessels. The sympathetic system has a less symmetrical arrangement than the cerebrospinal; the nerves are of a reddish color, and are composed, for the most part, of non-medullated or gray fibers.

"These two sections of the nervous system are intimately connected with each other—indeed, they can hardly be regarded as distinct systems; the sympathetic may be regarded as that portion of the nervous system which supplies the internal organs and blood-vessels." (Ashby's *Notes on Physiology.)*

5. "There are 31 pairs of spinal nerves, viz.: 8 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 1 coccygeal. Each nerve arises from the spinal cord by an anterior (motor) and a posterior (sensory) root, the latter having a ganglion developed upon it. These roots join together in the intervertebral foramen, and upon issuing from it immediately split up again into two parts, the anterior and posterior primary divisions, each containing fibers from the two roots. The anterior primary divisions supply the parts in front of the spine, the posterior primary divisions the parts behind that column." *(Aids to Anatomy.)*

CHEMISTRY.

1. Albumin is a protein substance, found in most animal tissues, and consisting of carbon, hydrogen, oxygen, nitrogen, and sulphur. It is soluble in pure water, and is coagulated by heat.

2. In the white of hen's egg.

3. and 4. In mercurial poisoning (by corrosive sublimate), also in poisoning by nitrate of silver.

5. By toxicology is meant that branch of medical science which appertains to poisons; it includes their character, origin, actions, symptoms produced, antidotes, treatment, and detection.

6. The process of slow oxidation.

7. By ptomain poison is meant the poisonous products of putrefaction of dead animal tissues and fluids.

8. Ptomains are derived from dead animal matter.

9. By the action of plants: the chlorophyl of which, under the influence of sunlight, decomposes the CO_2 into C and O_2. The plants retain the carbon in organic combination, and return the oxygen to the air.

MATERIA MEDICA AND THERAPEUTICS.

1. An *alkaloid* is an organic, nitrogenized substance, alkaline in reaction, and capable of combining with acids to form salts in the same way that ammonia does. A *tincture* is an alcoholic solution of a nonvolatile substance. A *fluid extract* is a permanent solution of a vegetable drug, in which one cubic centimeter of the solution represents one gram of the drug.

2. (1) Emetics, as tartar emetic, dose one to two grains; (2) diuretics, as potassium acetate, dose five to sixty grains; (3) hypnotics, as chloral hydrate, dose five to twenty grains; (4) mydriatics, as atropine sulphate, dose one one-hundred-and-twentieth to one-twentieth of a grain.

3. To stimulate the heart's action, strychnine; to produce emesis, apomorphine; to control hemorrhage, ergot.

4. Normal salt solution is of the strength of 0.7 of 1 per cent. It is *indicated* in shock or hemorrhage, as an irrigating fluid, and for intravenous infusion. *Method:* An aspirator needle is sterilized by boiling, and is then inserted into the loose connective tissue of the buttock, back, abdomen, or axilla. The needle is connected with a reservoir by means of a rubber tube, and the reservoir held several feet above the point of insertion of the needle, so that the fluid is slowly forced into the tissues, forming a swelling which slowly subsides as the fluid is absorbed. If more than a pint is injected the needle should be introduced in another situation.

5. Principal alkaloid of belladonna is atropine; *dose,* gr. 1/160. *Indications:* To relieve pain, relax spasms, to check secretions, to dilate the pupil, to prevent the griping of purgatives, in urinary incontinence, in inflammatory conditions, in asthma, whooping cough, and for the night sweats of phthisis.

6. Pulvis ipecacuanhæ et opii, ten grains; tinctura opii, about ten minims; tinctura opii camphorata, about half an ounce.

7. Sulphate of strychnine, gr. 1/90; sulphate of atropine, gr. 1/200; sulphate of morphine, gr. 1/6; apomorphine hydrochloride, gr. 1/12; nitroglycerin, ♏ ¾; pilocarpine hydrochloride, gr. 1/6.

8. ℞ Potassii acetatis
Potassii bitartratis
Potassii citratis.....ää ℥ij
Aquæ destillatæ q.s.....ad ℥viij. Misce.

Signa: One tablespoonful three times a day, in half a glass of water.

9. Salines cause a great increase in the amount of fluid secreted by the intestinal glands; they also hinder the reabsorption of this fluid. The result is an accumulation of

fluid in the intestine, which, by distention, excites peristalsis.

10. Nitrite of amyl is inhaled; it is kept in perles, which are crushed when required. It is used to dilate the blood-vessels in angina pectoris, epilepsy, cardiac dyspnea.

PRACTICE.

1.

APOPLECTIC COMA.	ALCOHOLIC COMA.
Deep coma; sudden onset. If any injury, only a scalp wound.	Can be aroused by supra-orbital pressure unless very profound.
Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Pupils normal or somewhat dilated.
Pulse full and slow, often arteriosclerotic high-tension pulse.	Pulse more rapid than normal and full.
Respiration slow and irregular.	Regular respiration.
Temperature higher on paralyzed side, but lower in rectum.	May be low or normal.
Urine contains trace of albumin, but may be same as in uremia.	Normal.
Hemiplegia with convulsions on one side.	

2. PERICARDITIS. *Etiology:* Rheumatic fever, eruptive fever, especially scarlet fever, septicemia, tuberculosis, gouty states of the blood, Bright's disease, and extension of inflammation from neighboring parts. *Physical signs:* A friction rub may be heard on auscultation. During the effusion there will be marked increase of cardiac dullness, displacement of the apex beat, muffling of the heart sounds, and, possibly, displacement of other organs. *Treatment: Absolute rest in bed.* A fly blister over the precordia. An hypodermic injection of morphine if pain be severe. Treat cause—if due to "rheumatic" poison be careful in the use of salicylates. They tend, if given early, to prevent cardiac lesions; but when these are established their depressant action in large doses may be harmful. Salicin is better in such cases. If heart failure threatens, give digitalis, *strychnine,* and diffusible stimulants. Paracentesis may be considered if the effusion is very great, and does not tend to become less.

To promote absorption after the acute symptoms have subsided: Blister. Purge with hydragogue cathartics. Ad-

minister iodides or chloride of ammonium. When these fail, paracentesis should be performed. The puncture should be made one inch from the left sternal margin in the fourth or fifth interspace. If the fluid be purulent, incise and drain. (From Wheeler and Jack.)

3. *Physical signs of acute lobar pnumenia:* In the first stage, there is diminished chest expansion, impaired percussion sound, feeble or absent respiratory murmur, râles, crepitation and sometimes a friction sound. In the second stage, expansion is diminished, and vocal fremitus is exaggerated on the affected side, dullness over the area of consolidation, also bronchophony. In the third stage the râle redux (with other râles) is heard, bronchial breathing is present, and dullness may persist.

4. BILIARY COLIC. It is caused by passage of a calculus along the bile ducts. It produces agonizing pain, of sudden onset, radiating from region of liver, and accompanied by vomiting. The pain lasts till the stone passes on into the intestine, or back into the gall-bladder. Tenderness and jaundice are present. Morphine should be given, and operation performed for removal of the stone (cholecystotomy or cholecystenterostomy).

5. Hemorrhage, and perforation of the intestines. Hemorrhage requires opium, or ergotin, and ice-bag to the cecum. For perforation, the very best thing is an early laparotomy and suture of the ruptured bowel.

6. *Acute catarrhal dysentery* "may be due to indigestible food, polluted drinking-water, or sudden changes in the weather. It is usually ushered in by an attack of diarrhea, accompanied by slight fever, nausea, and vomiting. There are intense abdominal pain and a constant desire to go to stool. The stools become more frequent and bloody. Tenesmus is worse in the afternoon and at night. Temperature may be normal or slightly elevated (100° F.). Rapid emaciation, exhaustion, and general nervous disorders follow. The case may terminate favorably in a week, or may be protracted and become chronic.

"*The treatment* consists of rest in bed and liquid diet. Rochelle salts (℥½) or Epsom salts (℥½) should be given to cleanse the bowels thoroughly. Castor oil (℥ı) with laudanum (gtt. 20) may be used. Pain is relieved by opium, alone or combined with bismuth subnitrate, cocain, or belladonna. Hope's camphor mixture (℥2) may be administered every 3 hours. The colon may be irrigated every 2 hours with lukewarm water or starch-water containing laudanum (℥½)." (Gould & Pyle's *Pocket Cyclopedia.*)

7. *Gonorrhea* is caused by the micrococcus gonorrheæ. Diagnosis is made by finding the gonococeus in the urethral (or vaginal) discharge.

To demonstrate *gonococci.* On a cover-glass make a smear with the discharge as thin as possible, and let it dry in the air; cover it with a freshly made solution of anilin-oil-gentian-violet for one or two minutes; wash it in distilled water; leave it in Gram's solution for two minutes; wash it in 95 per cent. alcohol until decolorized; wash it in distilled water; counterstain with a dilute carbol-fuchsin without heat, or with a saturated aqueous solution of Bismark brown; wash in distilled water, dry with filter paper, mount, and examine with an oil-immersion lens. The gonococci will appear as *diplococci within the leucocytes,* which have been *decolorized by Gram's stain,* and have taken the counterstain.

Treatment. Support the penis and testicles with a bandage; avoid violent exercise, alcoholics, and all sexual excitement; drink plenty of water; avoid spicy foods; urethral irrigation of hot corrosive sublimate solution 1 20,000, or of warm potassium permanganate solution, 1 :4,000.

8. Acute Articular Rheumatism. "The onset of the affection is usually sudden, although anorexia, sore throat, vague pains, etc., may precede. The inflammation first attacks the large joints, and may subside quickly in one joint to attack another. It is attended by high fever (103° to 104° F.), rapid pulse, and profuse acid sweats. The urine is scanty, high-colored, and contains an excess of uric acid and urates. Hyperpyrexia, organic heart disease, pneumonia, pleurisy, cerebral symptoms, various cutaneous eruptions, and rheumatic nodules may occur as complications.

Diagnosis.—The following table illustrates the characteristic points of the affections likely to be confused with rheumatism:

Gout.	Septic Arthritis.	Osteomyelitis.
1. Occurs late in life.	1. Septic process present.	1. History of long-continued pain.
2. Fever not high.	2. Onset slower.	2. Pain worse at night.
3. No acid sweats.	3. Hyperpyrexia not marked.	3. Moderate fever.
4. Affects small joints.	4. No acid sweats.	4. Acid sweats absent.
	5. Heart-lesions rare.	5. Heart-lesions rare.
		6. Often affects long bones.

The treatment of acute articular rheumatism consists in rest of the parts, and the patient should lie between blankets. The joints should be enveloped in soft wool or flannel. Restricted diet is essential. Fractional doses of

calomel (gr. ½ every hour for 6 hours) should be administered, followed by a saline purgative. Salicylic acid or its derivatives may be given in full doses, and diuretics are especially indicated. Hyperpyrexia may be controlled by phenacetin (gr. 5). During the convalescence, tonics are of decided advantage. Locally, lead-water and laudanum or belladonna liniment may be used. The diet should be carefully regulated." Gould and Pyle's *Pocket Cyclopedia.)*

9. *Measles is caused* probably by a micro-organism, but at present it is not isolated and identified. The *period of incubation* is about eight to twelve days. *Pathology*: "The first of the pathological changes is a specific catarrhal inflammation of the mucous membranes of the respiratory and intestinal tracts. The papule, according to Unna, is due to edema of the cutis and hypoderm, not, as in smallpox, to epithelial changes. Cellular exudation is almost completely absent. There is no leucocytosis, unless, it may be, before the eruptive stage." *Common complications* are: Capillary bronchitis, pneumonia, otitis media, diphtheria, nausea and vomiting, diarrhea.

10 MALARIA. *Cold Stage.*—Patient shivers violently, teeth chatter, skin is pale and blue, and papillæ are raised (gooseskin); there is a great tendency to collapse. There is often vomiting. The temperature, though much lowered externally, is, however, raised in the rectum. The urine is pale, copious, and of low specific gravity. This stage lasts from a few minutes to an hour or more. Towards the end of the stage the temperature may be 103° to 106°.

Hot Stage.—It may be gradual or sudden in its onset. The skin becomes hot and burning, and a patchy rash may form. There is vomiting or complete anorexia; throbbing of the carotids with intense headache, and there may be delirium. The temperature is often 106° or more, and the pulse is rapid and full. Often crops of herpes form at the mouth. This stage lasts from one to many hours, being longest in the æstivo-autumnal form. Enlargement of the spleen can often be demonstrated. Urine is scanty, of high specific gravity, and contains a large quantity of *urates and urea.* Albuminuria is frequent.

Sweating Stage.—The sweating commences at the roots of the hair, but soon becomes general and profuse. The pulse gets softer, the temperature falls gradually to the normal, and the patient is restored to the normal condition, the enlargement of the spleen diminishing or disappearing. During the sweating stage the urine is of high density, and scant in quantity; *urates* are more abundant than urea. The patient remains anæmic. This stage lasts from two to four hours. (Wheeler and Jack's *Practice.*)

The *treatment* is quinine given early, in doses of about 25 to 30 grains in twenty-four hours.

SURGERY.

1. GALL-STONES. "The *symptoms* begin with dyspepsia and pain in the right hypochondrium, and an examination may reveal a distended gall-bladder, which projects below the costal margin from the eighth or ninth rib. The tumor is elastic, perhaps fluctuating, and moves with the liver on inspiration. The percussion note over it is always dull. Medical treatment, consisting of regulation of the diet, purgatives, exercise, and massage, may relieve this condition, but if not, surgical interference is advisable.

And see PRACTICE, *Question* 4.

"*Cholecystotomy,* or opening the gall-bladder to remove stones or drain it, is done through an incision parallel to and 1½ inches below the costal margin over the gall-bladder. The liver is drawn up and the intestines packed away with gauze. If the gall-bladder is distended, the fluid is removed by tapping it with a trocar and cannula. The opening is then enlarged, and the stones are removed with a scoop. The bile-ducts are examined along their whole course by a finger externally, and by a long probe internally. If the interior is fairly healthy, the opening is sutured with two layers of continuous sutures and the abdomen is closed. Usually it is necessary to drain the gall-bladder for a time, in which case the margins of the opening are stitched to the peritoneum and transversalis fascia of the abdominal wound. The fistula thus established soon closes if there is no obstruction to the passage of the bile into the intestine. If not, it must be closed by a plastic operation or cholecystenterostomy." (*Aids to Anatomy.*)

2. Skin, dartos, intercolumnar fascia, cremasteric fascia, infundibuliform fascia, and the parietal layer of the tunica vaginalis.

3. *Contraindications for hemorrhoidal operation:* Cancer, or other serious rectal disease; hepatic or cardiac disease, as the cause of the hemorrhoids.

4. In *gallstones* there is excruciating pain in the right hypochondrium and epigastrium, muscular rigidity, vomiting, jaundice, and fever. In *gastric ulcer* the pain is not so severe, is in the epigastrium, begins soon after eating; there is no rigidity and no fever.

In *appendicitis:* "There is no initial rise of temperature, the latter usually appearing after a few hours. The vomiting in biliary colic immediately follows the onset, and not after a few hours, as in appendicitis. It is also more frequent during the continuance of the pain in biliary colic. The pain in the latter is more severe than in appendicitis, is located higher in the abdomen, as a rule, and radiates to the right shoulder. The muscular rigidity and tender-

ness are also higher, being most marked just beneath the costal arch. Appendicitis and cholelithiasis at times coexist, so that the clinical picture is a most confusing one."—(*Eisendrath.*)

5. For Bright's disease, Edebohls suggested nephropexy and decapsulation. The patient is anesthetized, and laid prone. The kidney is exposed by a vertical incision at the edge of the erector spinæ, but the sheath of this muscle is not opened. The fatty capsule is removed from the true capsule of the kidney, and the dissection is continued round to the pelvis of the kidney. The kidney is extruded from the wound, the true capsule is incised along the convex border and around each pole, and is then separated from the kidney, and cut away close to its junction with the pelvis of the kidney. The kidney is then returned to its bed of fat, and the wound is closed.

OBSTETRICS.

1. The Fallopian tubes are two in number, placed in the upper margin of the broad ligament. Each tube measures about 4 inches in length. The cavity commences by a narrow orifice called the *ostium internum,* and terminates in a *fimbriated extremity,* which passes over the superior and posterior borders of the ovary, and is attached by the fimbria ovarica to the superior pole of the ovary. (*Aids to Anatomy.*)

2. At full term the *placenta* is a soft, spongy mass, roughly saucer-shaped, from six to nine inches in diameter, about three-quarters of an inch in thickness at the central point, and weighs about one pound. Its *functions* are: (1) To supply nourishment to the fetus; (2) to act as a respiratory organ for the fetus; (3) to act as an excretory organ for the fetus.

3. *Differential diagnosis.—Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor, and the general condition of the patient's health may also help in arriving at a diagnosis.

Ovarian cystoma: Absence of the chief signs of pregnancy; there may be the characteristic facies, the tumor is soft, fluctuating, is more to one side, and does not show fetal signs.

4. "*Treatment of threatened abortion* includes rest in bed with absolute quiet; the administration of nerve sedatives, preferably suppositories of opium, one grain of the aqueous extract morning and evening; this may be supplemented by teaspoonful doses of the fluid extract of viburnum prunifolium four times daily. If the abortion is due to gen-

eral disease, such as typhoid fever, pneumonia, phthisis, or valvular heart disease, no attempt should be made to prevent it." (Gould and Pyle's *Pocket Cyclopedia.*)

5. ℞. Acidi borici.
Sodii bicarbonatis āā, ʒj. M.
Signa: Put two teaspoonfuls in douche bag of hot water and use as douche morning and evening.

6. *Treatment of placenta prævia:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of the cervix, version, and immediate extraction of the child.

7. For controlling hemorrhage, either vaginal or uterine; to exert pressure; to support the uterus; as a means of applying medication locally; and for depleting inflammatory conditions.

8. *Braxton Hicks' Method of Cephalic Version.*—(1) "The patient must be anesthetized and placed in the lithotomy position; the bladder and rectum must be emptied; (2) thorough asepsis of the vagina and cervical canal is essential; (3) upon the abdominal surface is placed the hand that corresponds to the position of the head—*i. e.* if the head lie in the right iliac fossa, the left hand of the accoucheur is used externally, and *vice versa;* the opposite hand is introduced into the vagina, while the index and middle fingers enter the cervical canal and rest upon the presenting shoulder; (4) the external hand presses the head downward and inward, while the fingers within the cervix press upward and outward; the head generally adjusts itself to the pelvic brim quickly and with an almost audible snap; (5) rupture of the membranes; (6) delivery by the forceps." (Dorland's *Obstetrics.)*

9. *Treatment of uterine inertia:* Endeavor to ascertain and remove the cause. Place the woman under the best hygienic conditions. If the source of reflex disturbances cannot be removed, we may quiet the nerve center by chloral, opium, or the bromide of potassium, after which the inertia is commonly relieved. When the patient is suffering from fatigue during a protracted labor, quinine is of great use. Massage and stroking of the uterus through the abdominal walls may be tried. If over-distention exists we should early rupture the membranes. (Landis' *Obstetrics.)*

10. *Management of normal labor. During the first stage* a rectal enema of soapsuds with turpentine (3i) should be given, and when the os is dilated to the size of a silver dollar the patient should be placed in bed, lying upon the side toward which the fetal back looks. If the pain is severe, chloral hydrate (gr. 15) may be given every half-hour for 3 doses.

During the second stage, examinations should be made every 10 or 15 minutes. In multiparæ the membranes may be ruptured with the finger or with some aseptic instrument. Care should be taken not to injure the child's scalp or the lower uterine segment. The pain may require the administration of chloroform or ether, but not to the extent of complete anesthesia. The expulsive force of the abdominal walls may be increased by directing the patient to pull upon a sheet firmly secured to the foot of the bed. Attempts may be made to prevent laceration of the perineum by making firm backward and upward pressure against the occiput during the pains; by restraining voluntary expulsive efforts during the pains; and by securing expulsion of the head between the pains. The head should be supported when born; the eyes should be cleansed with sterile water; and if the cord is coiled about the neck, it should be loosened or slipped over the head. Delay in delivery of the shoulders may be overcome by stimulating the uterus by friction through the abdominal wall or traction. The cord is ligated and cut when pulsation has ceased, and the child is placed by the mother's side with its face turned away from the maternal discharges.

During the third stage, 3i of fluidextract of ergot is administered and irritation of the uterus by friction through the abdominal wall is practised for 10 or 15 minutes. If the placenta is not expelled by this time, the uterus is firmly grasped between the thumb and 4 fingers and compressed. Firm pressure is then made from above downward and backward in the direction of the pelvic canal. This usually causes delivery of the placenta. A vulvar pad of salicylated cotton and carbolized gauze and an abdominal pad and binder are then applied." (Gould and Pyle's *Pocket Cyclopedia.)*

STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF THE STATE OF CALIFORNIA.

ANATOMY.

Answer Ten (10) Questions Only.

1. Describe the topographical anatomy of the knee, mentioning its bony landmarks and tendons.

2. What is the nerve supply of the flexor group of muscles of the forearms?

3. What are the surface points for the following: Bifurcation of the trachea; gall-bladder; spleen; termination of the spinal cord; kidney?

4. Mention from without inward the tunics of the eye, and describe one of them.

5. Give location of (*a*) deep cardiac plexus, (*b*) celiac

plexus, (*c*) aortic plexus, (*d*) Auerbach's plexus, (*e*) Meissner's plexus.

6. Describe the course of the portal vein, (*b*) give its relations.

7. What is the result of total paralysis of the abducent nerve?

8. Describe the venous and arterial anastomoses about the ovary.

9. Name the structures passing through the superior opening of the thorax.

10. What is the origin of the spermatic arteries?

11. What are the surface markings of the liver?

12. Describe the pleural sac, including attachments and contents.

HISTOLOGY.

Answer Only Eight Questions and Identify Four Slides.

1. Describe and locate the characteristic features, which would enable you to tell a section from the skin of the forearm of an Ethiopian from a section of the skin of a Scandinavian.

2. Name the primary blastodermic layers and name (*a*) the structures developed from the mesothelium; (*b*) the structures developed from the mesenchyme; (*c*) the structures developed from the mesameboid group of cells.

3. Describe a section of the human cornea made perpendicularly to the surface. Make drawing.

4. Describe those microscopic features which would enable you to distinguish a section of the thymus gland from a like section of a small lymph gland.

5. What structural differences are there between the Malpighian corpuscles of the spleen and those of the kidneys? Make drawings.

6. Describe the differences to be observed between a transverse section of the trachea as compared with a like section from the esophagus.

7. Describe and make a drawing of a cell that is typical of: (*a*) the cerebellum, (*b*) the cerebrum, (*c*) the retina, (*d*) the testes, (*e*) the blood.

8. What features would enable you to distinguish a section of the pancreas from a section of the parotid gland.

9. How do the fibers of the peripheral cerebrospinal nerves differ from the nerve fibers found in the brain and spinal cord? Make drawings of transverse sections.

10. What is an erythrocyte? Describe minutely and tell how a normal cell differs in the adult human being from that found in early fetal life.

11. Identify two slides.

12. Identify two slides.

PHYSIOLOGY.

Answer Ten (10) Questions Only.

1. Give proof that skeletal muscle possesses the properties of independent contractility and independent irritability.
2. Define the following physiological terms concerning the phenomena of muscle: Contracture, tetanus, summation, muscle tonus, rigor.
3. Discuss the inhibitory influence of the brain upon the spinal cord.
4. What are the causes of intravascular clotting?
5. How is the blood regenerated after hemorrhage?
6. Describe the coronary circulation during the heart beat.
7. What physiological properties does heart muscle exhibit which differ from those of skeletal muscle?
8. Define the terms intrathoracic pressure and intrapulmonic pressure.
9. What are the general properties of enzymes?
10. What is the origin of the hydrochloric acid in gastric secretion?
11. Describe the absorption of fats.
12. What are the internal secretions of the liver?

CHEMISTRY AND TOXICOLOGY.

Answer Ten (10) Questions Only.

1. Define: Inorganic chemistry; organic chemistry; synthetic chemistry; physiological chemistry; pathological chemistry; pharmaceutical chemistry.
2. Discuss the calcium and chorine groups.
3. How can you distinguish tin from other metals?
4. Give the names and formulæ of compounds of iron used in medicine.
5. How would you make oxygen to be administered to a patient in an emergency when a supply was not obtainable?
6. What does the normal mixed saliva contain?
7. How would you determine the specific gravity of blood?
8. What do the quantitative tests of gastric juice reveal?
9. How do acid albumins and alkali albumins differ; how are they affected by boiling; by acids?
10. What is the chemical treatment of alimentary corrosion caused by mineral acids? Why should the stomach pump be used carefully, if at all, in such cases?
11. Give the chemical and physiological treatment of phosphorus poisoning.

12. Given a urine that reduces Fehling's solution, what poisons would you suspect?

BACTERIOLOGY.

Answer Ten (10) Questions Only.

1. Name the germs which usually cause diarrhea. How would you distinguish Asiatic cholera from summer diarrhea?
2. What causes favus, ringworm, elephantiasis, soft chancre, fermentation of sugar? Give technical names.
3. Discuss, not over one page, "*Bacillus diphtheriæ.*"
4. How is yellow fever transmitted? Give in detail.
5. How is tuberculin R supposed to influence tuberculosis?
6. What is the specific test for syphilis? Upon what principle does the test depend?
7. Describe Pasteur's method of neutralizing the poison introduced into a person by the bite of a rabid dog.
8. Describe briefly hemolysis, bactericide, phagocytosis, antitoxin, antigen.
9. Name the germs which are the cause of conjunctivitis. Give 5.
10. How do germs produce pus?
11. Explain briefly natural immunity.
12. Describe Boas-Oeppler bacillus. What is its significance?

GENERAL DIAGNOSIS.

Answer Ten (10) Questions Only.

1. Describe the technique of a lumbar puncture and of what diagnostic value is it.
2. Describe the symptoms and course of meningitis tuberculosa.
3. Give the differential diagnosis in angina pectoris.
4. Describe arthritis deformans. For what may it be mistaken?
5. Describe the following pulses—positives, venous, Corrigan, mollis, dicrotic, bigeminus.
6. Give the etiology and symptoms of iritis.
7. Describe primary pernicious anemia.
8. How would you proceed in examining a chest for incipient pulmonary tuberculosis, and what would you expect to find at each step of the examination in a positive case?
9. Detail the signs and symptoms of a case of aneurysm of the transverse portion of the arch of the aorta.
10. Describe the test breakfast. Describe the methods pursued in determining the presence of (*a*) free hydrochloric acid, (*b*) lactic acid, (*c*) Boas-Oeppler bacillus. N. B.—Quantitative statements as to composition of reagents need not be given.

11. Define (*a*) hallucination, (*b*) delusion, (*c*) illusion, and describe paranoia.

12. What are the complications to be feared in the third week of typhoid fever and briefly enumerate their symptoms.

PATHOLOGY.

Answer Eight (8) Questions and Identify Four Slides.

1. Describe the blood changes in leukemia and what organic changes are usually found?

2. How does scar tissue differ from normal tissues and under what circumstances is it formed instead of normal structures?

3. In the study of tumors or growths what microscopic and microscopic characteristics would lead you to decide in favor of malignancy?

4. What are usually the immediate causes of death in typhoid fever in the third week, and describe the pathological condition you would expect to find post mortem in such a case?

5. In a severe or neglected case of diphtheria what organic lesions are usually found?

6. Describe fully the permanent changes likely to result from a neglected, long-standing case of gonorrheal infection.

7. What changes take place in the brain in senile dementia?

8. Describe the changes which take place in the eye in glaucoma.

9. Describe the condition of the lungs you would expect to find in a case of death of a child of two years old from pneumonia resulting from a severe neglected attack of measles.

10. Give the pathology of Addison's disease.

GYNECOLOGY.

Answer Ten (10) Questions Only.

1. How would you determine whether cancer of the cervix is operable or not?

2. Amenorrhea, classification, causes?

3. A fibroid tumor, the size of an orange, complicating pregnancy, what would you advise?

4. How would you determine if the pelvic floor is normal in a multipara?

5. Differential diagnosis, appendicitis and adnexal inflammation of the right side.

6. The use of the pessary in retroversion of the uterus, and the mechanism of its support?

7. Diagnosis between the menopause and pregnancy within the first four months?

8. What may be revealed by digital examination of the vagina?

9. Differential diagnosis, ovarian cyst with twisted pedicle and extrauterine pregnancy?

10. Describe a normal menstruation and state the changes that take place in the uterine mucous membrane.

11. What are the common causes of prolapsus uteri? In an operation for its cure, what conditions must be met, and how?

12. Describe the Fallopian tubes and ovaries, what are the natural supports?

OBSTETRICS.

Answer Ten (10) Questions Only.

1. What changes occur in the blood during pregnancy?

2. Give the names and measurements of the diameter of the pelvic inlet?

3. Describe fully the proper management when the head is above the superior straight and will not engage?

4. What do you understand by episotomy, and when is it called for?

5. What methods would you pursue for resuscitation of still-born child?

6. How would you determine that a dead infant had been born alive?

7. Describe conception and what is its physiology?

8. Give (*a*) some of the important intrauterine causes of asphyxia in the new born; (*b*) the external causes?

9. Describe in detail the changes that occur in uterus following childbirth and how long a time is required for involution?

10. In breach presentations describe the different methods of delivering the after-coming head?

11. What do you understand by version? Describe the management in two different forms.

12. What are the more common causes of adherent placenta?

HYGIENE.

Answer Ten (10) Questions Only.

1. Name four points to be observed in personal hygiene to prevent acquiring or imparting tuberculosis.

2. What course would you advise to be pursued to prevent tuberculosis in a child of tuberculous parents? Name four principal points.

3. What are the causes of mouth breathing and what are the deleterious results?

4. Name some special precautions a child should observe at school in order to avoid contracting disease.

5. Describe some practical steps to be pursued by a

municipality for the prevention of the spread of venereal diseases.

6. What should be done in prisons to prevent the spread of tuberculosis?

7. In a residence that is heated by a hot-air furnace located in the basement, what should be done to insure that the hot air is pure?

8. What are the hygienic advantages of automobiles over horses at the home and in the city?

9. Why is candy now one of the factors in the diet of American soldiers in the Philippines? What are the usual adulterations to be found in candy?

10. What are the dangers from the house fly? How would you prevent the breeding of flies? Describe three of the best methods of killing flies.

11. Give observations and methods necessary in the inspection of milk.

12. What sanitary precautions should be observed in typhoid fever? Give methods in detail.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF THE STATE OF CALIFORNIA.

ANATOMY.

1. *Topographical anatomy of the knee.* "Bony landmarks—patella; condyles of femur; tuberosities of tibia; tubercle of tibia; head of fibula. To find the articular line of the knee-joint—cross the leg on the knee, when the inner tuberosity of the tibia will project beyond the inner condyle of the femur and make the articulation-line evident. The depression between the outer tuberosity of the tibia and outer condyle of the femur may also be made out. The upper margin of the external tuberosity of the tibia, when the joint is semiflexed, not only represents the articular line—but also the lower limit of the synovial membrane of the knee-joint. The knee-joint lies about ¼ inch above the prominence of the tubercle of the tibia—and about opposite the transverse crease of skin in the popliteal space. When the limb is extended, the joint-line lies slightly above the apex of the patella. When the limb is slightly flexed, an instrument passed horizontally backward just below the apex of the patella will enter the joint. In full extension the lower third of the patella rests upon the condyles of the femur;—in full flexion, its upper third is in contact with the condyles;—in semiflexion, the middle third of the patella rests upon the greatest prominence of the femoral condyles. The apex of the patella, in extension, corresponds with the upper margin

of the tibia. This axis of the femur inclines inward from the pelvis. The axis of the tibia is vertical. The inner aspect of the inner condyle faces, practically, in the same direction as the head of the femur. Internally, the inner condyle of the femur is more marked, and the inner tuberosity of the tibia less. Externally, the outer tuberosity of the femur is less marked, and the outer tuberosity of the tibia more. The adductor tubercle of the femur is to be felt at the upper part of the inner condyle—and marks the lower epiphysis. The upper border of the tubercle of the tibia is on a level with the upper aspect of the head of the fibula. The head of the fibula may be felt at the outer and back part, in the depression between the tendon of the biceps above, and the peroneus longus below." (Bickham's *Operative Surgery.)*

2. The median and ulnar nerves.

3. The *bifurcation of the trachea* is at the level of the spinous process of the fourth dorsal vertebra.

The *fundus of the gall-bladder* is close to the outer margin of the right rectus abdominalis muscle, on a level with the ninth costal cartilage.

The *spleen.* "The long axis of the spleen corresponds to the tenth rib, and the viscus extends upwards to the upper border of the ninth rib, and downward to the lower border of the eleventh rib. The upper and inner pole lies 1½ to 2 inches away from the tenth dorsal spine, while the lower or anterior pole reaches as far forwards as the mid-axillary line." (Rawling.)

The *spinal cord terminates* at the lower border of the body of the first lumbar vertebra.

The *kidney.* "The upper end of the left kidney would be defined by a line drawn horizontally outward from the spinous process of the eleventh dorsal vertebra and its lower end by a point two inches above the iliac crest. The right kidney would be half to three-quarters of an inch below. Morris lays down the following rules for indicating the position of the kidney on the posterior surface of the body: 1. A line parallel with, and one inch from, the spine, between the lower edge of the tip of the spinous process of the eleventh dorsal vertebra and the lower edge of the spinous process of the third lumbar vertebra. 2. A line from the top of the first line outward at right angles to it for two and three-quarter inches. 3. A line from the lower end of the first transversely outward for two and three-quarter inches. 4. A line parallel to the first and connecting the outer extremities of the second and third lines just described." (Gray's *Anatomy.*)

4. (1) Sclera and cornea; (2) choroid, ciliary body, and iris; (3) retina.

The *iris* is a thin, circular, colored membrane suspended

in the aqueous humor, behind the cornea and in front of the lens. It is perforated by a circular aperture—the pupil. It is connected with the choroid, the sclerotic, and cornea. It consists of a stroma of connective tissue ,with blood vessels, nerves, pigment cells, and also two groups of involuntary muscle fibers—circular and radiating. *Blood supply*: Long and anterior ciliary arteries, and short ciliary arteries. *Nerves:* Ciliary, from lenticular ganglion and nasal branch of ophthalmic division of fifth cranial nerve.

5. (*a*) The ***deep cardiac plexus*** is situated in front of the trachea, at its bifurcation, above the point of division of the pulmonary artery, and behind the arch of the aorta.

(*b*) The *celiac plexus* surrounds the celiac axis and root of superior mesenteric artery.

(*c*) The ***aortic plexus*** is on the sides and front of the aorta, between the origin of the superior and inferior mesenteric arteries.

(*d*) ***Auerbach's plexus*** lies between the circular and longitudinal muscular fibers of the intestines.

(*e*) ***Meissner's plexus*** lies in the submucous coat of the intestines.

6. The *portal vein* is formed by the union of the splenic and superior mesenteric veins in front of the right crus of diaphragm and inferior vena cava, and behind the neck of the pancreas. Passes up behind first part of duodenum and then between the layers of the small omentum, behind and between the common bile-duct and hepatic artery, the duct being placed on the right and artery on the left, to transverse fissure of liver, where it divides into right and left branches to corresponding lobes, and also gives an offset to the Spigelian lobe. Connected with the branch to the left lobe are in front the *obliterated umbilical vein* and behind the *ductus venosus,* the remains of a fetal connection with the inferior vena cava. (*Aids to Anatomy.*)

7. Paralysis of the abducens nerve causes internal or convergent strabismus.

8. "The branches of the ovarian arteries which supply the ovaries are exceedingly tortuous, even to their minute subdivisions. They cover the surfaces of the ovaries and enter them at the hila. Those covering the glands form, in the zonæ vasculosæ, rich capillary net works about the ovisacs. The veins emerging at the hila enter plexuses in which the ovaries and ovarian ligaments seem to be partly embedded. To these plexuses is sometimes applied the name of the 'bulbs.' Upon each side the blood from the bulb, the Fallopian tube, and the body of the uterus enters an extensive venous plexus surrounding the ovarian artery. This is the pampiniform plexus, and is drained by the ovarian vein." (Jewett's *Obstetrics.*)

9. *Structures passing through superior opening of the thorax:* Sternohyoid, sternothyroid, inferior thyroid veins, trachea, esophagus, longus colli, recurrent laryngeal nerves, apex of lung, internal mammary artery, phrenic and vagus nerves; innominate vein and artery, cardiac nerves, right lymphatic duct, left common carotid and subclavian arteries, thoracic duct, sympathetic and first thoracic nerves, superior intercostal artery.

10. The spermatic arteries arise from the front of the abdominal aorta, a little below the origin of the renal arteries.

11. *Surface markings of the liver:* The *upper margin* of the liver in front is represented by a line drawn from the upper margin of the fifth rib on the right (half inch below the nipple). This line should curve downward at its mid-point to the base of the ensiform cartilage. On the side the upper limit corresponds to the seventh intercostal space in the midaxillary line; *behind* to the ninth intercostal space in the scapular line. The *lower margin* of the liver follows the border of the right costal arch as far as the ninth costal cartilage, where it crosses the epigastrium obliquely to the eighth costal cartilage in the left and joins the left extremity of the upper margin (one inch below the left nipple). In the median line the lower border of the liver is about a hand's breadth below the base of the ensiform cartilage. The left lobe lies to the left of the median line, and the interlobular notch is opposite the median line." (Campbell's *Surgical Anatomy.*)

12. "The *pleuræ* are two serous sacs enclosing and investing the lungs. Each pleura consists of a visceral and parietal layer. The *visceral* portion covers the lung, and the *parietal* layer lines the inner surface of the chest walls, the upper surface of the diaphragm, and the sides of the pericardium. The visceral and parietal layers of the corresponding pleura become continuous in front and behind the root of the lung; and below the root a fold, the *ligamentum latum pulmonis,* extends downwards along the inner surface of the lung to the diaphragm. The mediastina are formed by the visceral layers of each side approaching one another towards the median line.

"The limits of the parietal pleuræ are as follows: each extends upwards into the neck, forming a dome-like process over the apex of the lung about two inches above the first costal arch; from this the pleura passes downwards and forwards to the posterior aspect of the sternoclavicular joint of each side and meets its fellow in the mid-line at the manubrio-gladiolar articulation; they pass down together to level of fourth costal cartilages, where *right pleura* passes vertically to level of seventh right costal cartilage in mid-line; then outwards, crossing ninth rib

in mid-axillary line; then downwards and backwards along eleventh rib to reach spine at neck of twelfth rib. Behind, it passes upwards on right side of bodies of vertebræ to apex. At level of fourth costal cartilage the *left pleura* arches outwards, leaving uncovered part of anterior surface of pericardium, and lying about three-quarter inch from the margin of sternum, to reach seventh costal cartilage, where it follows same line as on right, but is placed at a slightly lower level." (*Aids to Anatomy.*)

HISTOLOGY.

1. In the Ethiopian, the lower row of cells in the Malpighian layer will be found to be pigmented.

2. The primary blastodermic layers are the ectoderm, entoderm, and mesoderm. From the *mesothelium* are derived the various endothelial cells which line the serous cavities. From the *mesenchyme* are derived the different forms of connective tissue, as bone, cartilage, fibrous tissue, etc., blood, blood-vessels, lymphatics, spleen.

3. A section of the cornea will show from without inwards corneal epithelium, anterior elastic membrane, substantia propria, posterior elastic membrane, and endothelium.

4. in the *thymus* will be found nests of epithelial cells lying in the medulla; these are called corpuscles of Hassal.

5. The *Malpighian* corpuscle of the *spleen* is a kind of lymph pocket in the outer coat of a small artery.

The Malpighian corpuscle of the *kidney* is a tuft of blood capillaries surrounded by Bowman's capsule.

6. A transverse section of the *trachea* shows from within outwards: Ciliated epithelium, longitudinal elastic fibers, mucous glands and fat cells, and sections of cartilage.

A similar section of the *esophagus* shows: Stratified epithelium, muscularis mucosa, mucous glands in the submucosa, circular muscular layer, longitudinal muscular layer, and a fibrous coat.

7. *Cerebellum.* Purkinje's cells are the largest nerve cells in the body, being about seven times the diameter of a red blood corpuscle. They form a single row of cells, their neuraxes arise from the basal end of the cell body. The other extremity of the cell body passes into prominent dendrites, which branch freely in one plane.

Cerebrum. The cells in the outer layer are polygonal, triangular, stellate, or spindle shaped. Their neurons are as a rule confined to that layer, very few axones reaching down to the deeper layers.

Retina. The cells of the inner nuclear layer are arrayed in several rows; some cells are sustentacular or neuroglial, some bipolar ganglion cells, and some multipolar ganglion cells.

Testes. The columns of Sertoli or sustentacular cells are columns of elongated columnar cells extending from the basement membrane towards the lumen of the tube. They give off lateral processes which form a reticulum about groups of spermatozoa.

Blood. The platelets are small, colorless, round non-nucleated bodies about one-third the size of a red blood corpuscle.

8. The *pancreas* would show the islands of Langerhans; these are not found in the *parotid gland.*

9. In the brain and spinal cord, medullated fibers are found without a neurilemma; whereas they are found with a neurilemma in the cranial and spinal nerves.

10. An *erythrocyte* is a red blood corpuscle. It is a circular, biconcave, non-nucleated disc; it is soft and elastic; it contains hemoglobin and a stroma. In the adult it is non-nucleated; in early fetal life it is nucleated.

PHYSIOLOGY.

1. If an animal is curarized and a skeletal muscle is stimulated it will contract, thereby proving it has an independent irritability.

2. *Contracture* is change in the form of a muscle, due to a stimulus.

Tetanus: When stimuli are added so rapidly that the effects of the preceding ones have not had time to pass off the muscle is at no time perfectly relaxed; this condition is called *tetanus.*

Summation: If a muscle which has been stimulated is again stimulated before the effect of the first stimulation has ceased, a second curve is produced which is higher than the first, and is due to the addition of the second stimulus to the former one; this is called *summation of stimulation.*

Muscle tonus is the state of continuous contraction which is generally but slight.

Rigor is the condition into which muscle passes when it dies, or passes from a fluid to a solid state; the muscle shortens, becomes rigid, and does not respond to stimuli.

3. "In the reflex from tickling, for instance, we know that by a voluntary act we can repress the muscular movements up to a certain point; so also the limited control of the action of the respiratory and micturition centers is a phenomenon of the same character. To explain such acts we may assume the existence of a definite set of inhibitory fibers, arising in parts of the brain and distributed to the spinal cord, whose function is that of controlling the activities of the spinal centers. In view of the fact, however, that there is no independent proof of the existence of a separate set of inhibitory fibers within the cen-

tral nervous system; that is, a set of fibers whose specific energy is that of inhibition, it is preferable to speak simply of the inhibitory influence of the brain upon the cord, leaving undecided the question as to whether this influence is exerted through a special set of fibers or is brought about by some variation in the time relations, intensity, or quality of the nerve impulses."—(Howell.)

4. *Causes of intravascular clotting:* Damage to, absence of, or disease of the intima or vessel walls; the presence in the circulation of substances not covered by endothelium; retardation of the blood-stream; certain conditions of the blood such as are found after inflammations, diseases, hemorrhages.

5. *Regeneration of blood after a hemorrhage:* "If the bleeding does not go on to death the blood is restored by absorption from the tissues or from the food taken in; the first to be absorbed being the serum sanguinis, with the dissolved salts, and then the albumen. A longer time is required to form new red blood-corpuscles. Regenerated blood is at first abnormally watery and poor in cells. As a result of the greater flow of lymph into the blood the number of white blood-corpuscles is greatly increased, and then their number falls off; the red blood-corpuscles again attain their usual number, and the composition of the blood gradually returns to the normal. We do not as yet know certainly how the restoration of the red blood-corpuscles takes place. The most generally accepted view is that colorless corpuscles are being constantly formed in the lymph glands, in the spleen, in the bone marrow, and in the liver, and a certain number of these colorless corpuscles change into the red disks."—(Tillmann's *Surgery.*)

6. *Coronary circulation during the heart beat:* "During systole, the mouths of the coronary arteries are in free communication with the aorta. But the coronary system—arteries, capillaries, and veins—is in part imbedded in the musculature of the ventricles, and we should suppose that the greater pressure exerted by the contracting musculature would at the height of systole clamp off this system and stop the coronary circulation. That this result really happens is indicated by Rebatel's curves which show a great acceleration in the velocity at the beginning of systole, quickly followed by a drop to zero or even a negative value—indicating a flow in the other direction, toward the aorta. At the end of the first (relaxation) phase of diastole, there is again a sudden increase in velocity, corresponding with the injection of the arteries from the aorta, and this again by a decrease at the end of the diastole at the time when the ventricular cavity is filled with venous blood under some pressure. . . . The rhythmical squeeze of its own vessels during systole ac-

celerates effectively the coronary circulation."—(From Howell's *Physiology.*)

7. Heart muscle contracts more slowly than skeletal muscle, and also has the power of rhythmic contractility; heart muscle is involuntary (physiologically), whereas skeletal muscle is voluntary.

8. *Intrathoracic pressure* is the pressure in the thoracic cavity outside the lungs.

Intrapulmonic pressure is the pressure in the interior of the lungs and air passages.

9. *General properties of enzymes:* They are generally soluble in water, or salt solutions, or in glycerine; they do not work in extreme temperatures, but require an "optimum" temperature approximating that of the body; they are precipitated by excess of alcohol; they require a suitable medium to work in; the products of their activity must be removed; they are capable of causing change in a large amount of material, while they themselves remain unaltered.

10. The *hydrochloric acid* is formed from the chlorides of the blood in the secreting cells of the stomach. The sodium chloride is broken up and the chlorine combines with hydrogen and is then secreted as hydrochloric acid.

11. *Absorption of fats:* Fats exist finally in the small intestine as glycerine salts and soaps. The columnar epithelial cells certainly absorb these substances, and cause them to combine back, as it were, and thus there appear fine droplets of fat in the epithelial cells. These droplets are then extruded into the subjacent corium of adenoid tissue, where they are taken up by ameboid cells. These cells then pass into the lacteals; some give out their fatty droplets without undergoing disintegration; the majority of them, however, undergo disintegration. There is thus formed in the lacteals an emulsion, with lymph as the suspending agent. This emulsion passes along the lacteals, which converge upon a large lymphatic sac—the receptaculum chyli—whence passes the thoracic duct, to terminate by entering into the angle of junction between the left internal jugular and subclavian. Mixing with the blood, the fat droplets are carried all over the body, and are finally deposited in fatty cells in adipose tissue, probably being carried there from the blood by leucocytes.—(Lack.)

12. *The internal secretions of the liver* are glycogen and urea.

CHEMISTRY AND TOXICOLOGY.

1. *Inorganic chemistry* is the chemistry of compounds which do not contain carbon.

Organic chemistry is the chemistry of the carbon compounds.

Synthetic chemistry is that branch of chemistry which is concerned with the building up of compounds out of elements or simpler compounds.

Physiological chemistry is the chemistry of the living organism and its various processes.

Pharmaceutical chemistry is chemistry in its application to the analysis or synthesis, or preparation of drugs.

2. *The calcium group* consists of calcium, barium, and strontium. These elements are called the metals of the alkaline earths, they are bivalent in all their compounds, they form two oxides, their sulphates and carbonates are insoluble or very slightly soluble, their hydroxides are known as the alkaline earths and have basic characters.

The *chlorine group* consists of chlorine, fluorine, bromine, and iodine. They are called halogens; they are generally univalent; they form hydracids, consisting of one volume of the element in the gaseous form with one volume of hydrogen; they form monobasic acids; they all possess bleaching and disinfecting powers, and are strongly irritant. Fluorine is a gas but can be liquefied with difficulty; chlorine is an easily liquefied gas; bromine a liquid, and iodine a solid.

3. Tin can be distinguished from other metals by the peculiar crackling sound it emits on being bent.

4. Ferrous sulphate, $FeSO_4$; ferrous carbonate, $FeCO_3$; ferrous iodide, FeI_2; ferric chloride, Fe_2Cl_6; ferric sulphate, $Fe_2(SO_4)_3$; ferric hydroxide, $Fe_2(OH)_6$; ferric ammonium sulphate $FeNH_4(SO_4)_2$; ferric hypophosphite, $Fe(H_2PO_2)_3$; ferric citrate, $FeC_6H_8O_7$; ferrous lactate, $Fe(C_3H_5O_3)_2$.

5. Oxygen can be prepared by heating potassium chlorate in a glass flask fitted with a perforated cork and a bent tube for conveying the gas to a pneumatic trough, where it can be collected over water.

$$2KClO_3 = 2KCl + 3O_2.$$

6. *Normal mixed saliva contains:* Water, mucin, albumin, ptyalin, maltase, urea, potassium thiocyanate, potassium oxide, sodium oxide, calcium oxide, ferric oxide, magnesium oxide, sodium chloride, potassium chloride, sodium bicarbonate.

7. *To determine the specific gravity of blood*: Make a mixture of chloroform and benzol, in such proportions that the specific gravity of the mixture is almost 1050 to 1055. Let a drop of blood fall into it. If the blood sinks add more benzol; if it floats on the surface add more chloroform until the blood drop remains suspended. The specific gravity of the mixture is then determined, and is equal to the specific gravity of the blood.

8. Quantitative tests of gastric juice reveal: The quantity of hydrochloric acid, the total acidity, combined

acidity, free acidity, and acidity due to organic acids and acid salt, the existence of hyperchlorhydria, hypochlorhydria or anachlorhydria.

9. *Acid albumins* are insoluble in water, in dilute saline solutions and in alcohol. When freshly precipitated they are readily soluble in dilute acids or alkalis, but insoluble when mixed with calcium carbonate suspended in water. *Alkali albumins* dissolve very sparingly in water and in saline solutions, slightly soluble in hot alcohol. Shaken with water and calcium carbonate they dissolve, liberating carbon dioxide. They are not coagulated by heat, but are readily precipitated in an acid, if saturated with solution of sodium chloride.

10. Give magnesia suspended in water, or a solution of soap. The stomach pump should not be used, as its introduction may cause perforation of the already corroded tissues.

11. There is no chemical antidote to phosphorus; the physiological antidote is old French oil of turpentine.

12. In a urine that reduces Fehling's solution the following poisons might be suspected: Acetanilide, chloral, chloroform, morphine, antipyrine, copaiba, rhubarb and salicylic acid.

BACTERIOLOGY.

1. Bacillus dysenteriæ of Shiga, bacterium lactis, bacillus coli, bacillus proteus.

In Asiatic cholera, the cholera spirillum will be found; it is not present in summer diarrhea.

2. *Favus* is caused by Achorion schonleinii; *Ringworm,* by Tricophyton fungus; *Elephantiasis,* by Filaria sanguinis hominnis; *Soft Chancre,* by bacillus of Ducrey; *Fermentation of Sugar,* by Enzymes.

3. The bacillus of diphtheria is called the Klebs-Loeffler bacillus. *Characteristics:* The bacilli are from 2 to 6 mikrons in length and from 0.2 to 1.0 mikron in breadth; are slightly curved, and often have clubbed and rounded ends; occur either singly, or in pairs, or in irregular groups, but do not form chains; they have no flagella, are non-motile, and aërobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue.

4. Yellow fever is transmitted by the bite of the Stegomyia fasciata mosquito after it has fed on the blood of an infected person. It is not transmitted by fomites or contact.

5. Koch claimed that tuberculin would not directly kill the bacilli, but that it would act powerfully and specifically upon living tuberculous tissue, causing a necrotic condition and hastening its disintegration. He also claimed that it might be expected to increase the resistant power of

healthy tissue, and to starve the bacilli, check their increase and so lead to the cure of the disease. (Potter.)

6. The specific test for syphilis is the Wassermann reaction. "The principle involved is that hemolysis does not occur in the presence of a hemolytic amboceptor when emulsions of bacteria are mixed with an inactivated serum with the addition of a complement. The reason is that the complement binds itself with the bacteria and thus prevents the union of complement with the red cell through the medium of the amboceptor." (Wilcox's *Treatment of Disease.*)

7. "The Pasteur method of treatment for hydrophobia is based upon the fact that the rabic virus in the spinal cord of rabbits loses strength at a fairly regular and even rate when the cord is removed from the body after death and carefully dried. In the preparation of material for the preventive treatment rabbits are inoculated with 'fixed virus'—a term given by Pasteur to virus that is so exalted in virulence by successive passages through rabbits that it will produce the death of these animals in six or seven days. Beyond this point no increase of virulence can be obtained; hence the name, fixed virus. The spinal cord is removed aseptically from rabbits killed by the inoculation of fixed virus, cut into three pieces, and suspended over a solution of caustic potash in a drying chamber. Here the cords are kept in the dark and at a constant temperature of 23° C. for fourteen days. Emulsions of the dried cord are prepared in sterile salt solution or broth and injected every day, or sometimes more frequently, during a period of fifteen to twenty-one days, the interspacing of doses and duration of treatment being determined by the nature of the case. As a rule, the most attenuated material (fourteen-day cord) is injected first, and this is followed by virus of gradually increasing strength." (Jordan's *Bacteriology.*)

8. *Hemolysis* is the destruction of the red blood corpuscles by a specific antiserum.

Bactericide is any agent capable of destroying bacteria.

Phagocytosis is the process by which cells (chiefly leucocytes) ingest bacteria or other cells.

Antitoxin is a substance in the serum which neutralizes a toxin.

Antigen is a substance which, when introduced into the animal organism, produces an antibody.

9. *Five germs which may cause conjunctivitis:* Koch-Weeks bacillus, pneumococcus, gonococcus, streptococcus pyogenes, and staphylococcus pyogenes aureus.

10. The bacteria enter an inflamed or injured part; they there produce toxins which exert a digestive action on the leucocytes and neighboring cells, and thus pus is formed.

11. *Immunity* is the power of resistance of cells and tissues to the action of pathogenic microorganisms. Immunity may be either natural or acquired.

Natural immunity is that power of resistance, natural and inherited, and peculiar to certain groups of animals, but common to every individual of these groups.

Acquired Immunity is this resistance acquired (1) by a previous attack of the disease, or (2) by the person being made artificially insusceptible. The conditions which give immunity are: (1) a previous attack of the disease; (2) inoculation with the specific microorganisms in small numbers or of diminished virulence, so as to produce a mild attack of the disease; (3) vaccination; (4) the introduction of antitoxins; (5) the introduction of the toxins of the bacteria.

Examples.—The rat is *naturally immune* to anthrax; the white mouse is *naturally immune* to infection with bacillus mallei. *Acquired immunity* is seen in the immmunity from smallpox after vaccination, or after having suffered from an attack of the disease.

12. *Boas-Oppler bacillus* is a long, non-motile rod; it is probably a leptothrix; is readily dyed by aniline stains, but not by iodine solutions. It is supposed to produce lactic acid; it is present in the gastric contents in gastric cancer, and is supposed to be significant of that condition.

GENERAL DIAGNOSIS.

1. *Lumbar Puncture.* Place patient on his left side with knees drawn up. A line at the level of the iliac crests passes between the third and fourth lumbar vertebræ. Take a point midway between the spinous processes of these lumbar vertebræ, and enter a sterile needle inward and upward. Collect the material in a sterile test tube. Diagnostic use in cerebrospinal meningitis, trypanosomiasis, tuberculous meningitis.

2. *Tuberculous Meningitis.*—An inflammation of the soft intracranial membranes due to the deposit of gray miliary tubercles. It is usually secondary to tuberculosis elsewhere, and is seen most often in children. The onset is usually attended with various prodromes, such as irritability, anorexia, headache, insomnia, etc. The stage of excitation is characterized by headache, vomiting, convulsions, intermittent temperature, soft, irregular, and compressible pulse, and a red line upon drawing the finger-nail over the skin. This stage lasts for about two weeks and is followed by depression, in which the pulse is slow and compressible, temperature is depressed, and somnolence and stupor alternating with delirium, convulsions, headache, and peculiar shrieking are present. Collapse, coma, convulsions follow, and death usually results in from one day to two weeks." (*Pocket Cyclopedia.*)

3.

TRUE ANGINA.	PSEUDO-ANGINA.
Most common between the ages of forty and fifty years.	At every age, even six years.
More common in men. Attacks brought on by exertion.	More common in women. Attacks spontaneous.
Attacks rarely periodical or nocturnal.	Often periodical and nocturnal.
Not associated with other symptoms.	Associated with nervous symptoms.
Vasomotor form rare. Agonizing pain and sensation of compression by a vise.	Vasomotor form common. Pain less severe; sensation of distention.
Pain of short duration. Attitude: silence, immobility.	Pain lasts one or two hours. Agitation and activity.
Lesions: sclerosis of coronary artery.	Neuralgia of nerves and cardioplexus.
Prognosis grave, often fatal.	Never fatal.
Arterial medication.	Antineuralgic medication.

(Huchard.)

4. *Arthritis deformans.* A degenerative joint-affection, characterized by its chronicity and tendency to joint-fixation by the development of osteophytic processes which mechanically impede motion. Arteriosclerosis and traumatism are etiologic factors. It usually occurs in individuals past middle life, but occasionally in girls after puberty. Acute exacerbations are common. The symptoms are pain, deformity, and a grating sensation on motion, which becomes limited. It might be mistaken for rheumatism.

5 *Venous pulse* is a pulsation occasionally observed in the jugular veins, owing to some of the blood of the right ventricle flowing back into the right auricle and communicating an impulse to the venous blood entering the auricle from the superior vena cava.

Corrigan pulse is a pulse characterized by a short, sharp, strong impulse, which seems to collapse under the examiner's fingers. It is found in aortic regurgitation.

Pulsus mollis, or soft pulse, is one of low tension and easily compressible.

Dicrotic pulse is one in which the first impulse is quickly followed by another impulse or secondary wave.

Pulsus bigeminus is one in which there are two regular beats followed by a longer pause.

6. IRITIS. *Causes*: Syphilis, rheumatism, gonorrhea,

gout, diabetes, leprosy, scrofula, tuberculosis, injury transmission from the eye. *Symptoms*: Pain, photophobia, small pupil, ciliary congestion, discoloration of iris, exudate in anterior chamber.

7. *Pernicious anemia* is a grave form of anemia, characterized by a diminution in the number of red cells. Cause is unknown, but is probably due to some defect in the blood-making organs. White cells are somewhat diminished; hemoglobin is variable; fever is irregular or absent; the body appears well nourished; it is of insidious onset, with muscular weakness, pallor, and dyspnea. Prognosis is bad.

8. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs*: Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist râles at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

9. *Aneurysm of transverse portion of arch of aorta:* May be bulging and pulsation; expansile pulsation; tracheal tugging; alteration in radial pulse; pulsation in episternal notch; systolic thrill; dullness; pressure symptoms possible on trachea, left bronchus; dyspnea, cough, paralysis of left vocal cord; dilatation or contraction of (left) pupil.

10. *Test breakfast* consists of one or two rolls and a cup of water. *Test for free hydrochloric acid.* A few drops of Gunzburg's reagent are added to a small quantity of gastric filtrate, and evaporated to dryness. A beautiful rose-red color denotes free hydrochloric acid. *Lactic acid* is detected by Uffelmann's reagent, which gives a canary-yellow color with the gastric filtrate. *Boas-Oppler bacilli* are non-motile, arrayed in clumps or chains, stain brown with iodine solution and also stain by Gram's method.

11. A *delusion* is a belief in something which has no real existence, but is purely imaginary; and out of which the person cannot be reasoned. An *illusion* is a false or perverted impression, received through one of the senses. An *hallucination* is the same as an illusion, but without any material basis.

If an individual believes himself to be made of glass, and is afraid of being touched lest he be broken, he is suffering from a *delusion*. If the whistling of the wind is mistaken for a voice telling a person to do a certain thing—that would be an *illusion*. If a person fancied he heard a voice when there was nothing at all to be heard, that would be an *hallucination*.

Paranoia is a primary chronic form of insanity, occurring especially in degenerates, and marked by hallucina-

tions and delusions which are systematized, *i.e.* exhibit a logical connection and sequence, so that the patient from his perverted ideas, in which he firmly believes, draws logical and coherent influences. (From Duane's *Medical Dictionary.*)

12. Hemorrhage and perforation. *Hemorrhage* shows: collapse, pallor, restlessness, air-hunger, cold extremities, drop of temperature, profuse sweat, weak and rapid pulse. Sometimes blood is passed by rectum.

Perforation shows: Sudden and severe abdominal pain, shock, pinched features, clammy perspiration, small, rapid pulse, rigid and tender abdominal muscles, shallow respirations, nausea and vomiting.

PATHOLOGY.

1. *Blood changes in leucemia.*—Blood is light in color, specific gravity is lowered, coagulation is slow, leucocytes are greatly increased.

The spleen and lymphatic gland may be enlarged. There may be lymphoid infiltrations of lungs, heart, and kidneys.

2. *Scar tissue* tends to contract, becomes lighter in color, tends to tumor formation (keloid), is weak, neither hair nor perspiration is found on it. Scar tissue is formed when immature connective tissue is converted into mature fibrous tissue.

3. A malignant tumor is atypical, is not encapsulated, infects the neighboring lymphatic glands, tends to recur, infiltrates the surrounding tissues.

4. *Intestinal perforation and hemorrhage.* There will probably be an ulcer at the site of the hemorrhage or perforation. This ulcer lies in the main axis of the intestine, it lies opposite the mesenteric attachment, and has undermined edges.

5. Necrotic foci in the liver, with degenerations; inflammation and degeneration of heart, kidneys and nerves.

6. Stricture, periurethral abscess, posterior urethritis, epididymitis, salpingitis, conjunctivitis, arthritis, tenosynovitis.

7. "The characteristic change of *senile dementia* consists of a general sclerosis of the arteries of the brain, often with hyalin fibrous degeneration. Sometimes the great vessels are intact while the small vessels and capillaries are diseased. There is an attenuation of the bones of the cranium, the diploe is visible (malum senile), generally external and internal pachymeningitis are present, quite often with hematomata, clouding of the arachnoid inlaid with calcareous plaques, large Pacchionian granulations, atrophy of the brain cortex, especially of the frontal lobes, and granulations of the ependyma. In a third of all cases there is hemorrhagic or thrombotic softening of the brain; further, sclerotic changes in the spinal cord. Microscopically, the atrophic brain shows hypertrophy of the neu-

roglia, sometimes with miliary sclerosis of the cerebral cortex, disappearance of the tangential fibers, decrease of the number of the nerve cells of which those present are atropho-pigmentous, and fatty degeneration with chromatolysis. The smallest vessels and capillaries often seem destroyed, sometimes changed into strings without lumen. The peripheral nerves often show signs of a degenerative neuritis."—(Mendel-Krauss.)

8. In *acute glaucoma:* "Objective examination reveals marked increase in tension; the cornea is clouded or steamy (due to edema), often presents punctate opacities, and is insensitive (from pressure upon nerve filaments); there is pronounced circumcorneal injection of a dark red color; the episcleral veins are prominent. The pupil is dilated, oval, immobile, and often presents a greenish reflex. The iris is congested, discolored, and dull. The anterior chamber is shallow, the aqueous sometimes turbid. The lens and the periphery of the iris are pushed forward. The lids are swollen and edematous. The ocular conjunctiva is markedly congested and chemotic. No details of the fundus can be seen with the ophthalmoscope, on account of the clouding of the media."—(May.)

9. "In bronchopneumonia both lungs are generally diffusely involved, areas of consolidation being scattered throughout. On the pleural surface small nodular elevations, dark red or slightly reddish-gray in color, are seen. Are smooth on section. These areas are firm, and when separated from the surrounding tissue will sink in water. The lung in the immediate vicinity may be emphysematous, other portions being collapsed—atelectasis. Microscopically the alveoli are found to contain an exudate, albuminous in character, in which desquamated epithelial cells, leukocytes, and erythrocytes are present. There is also a marked round-cell infiltration of the septa. The red blood-cells and the leukocytes are not, as a rule, found in large numbers unless the infection has been due to pyogenic organisms. The exudate may then be hemorrhagic or purulent; in either case gangrene may develop."—(McConnell's *Pathology.*)

10. There is fibro-caseous tuberculosis of the suprarenal glands; changes may also be found in the sympathetic nervous system.

GYNECOLOGY.

1. Cancer of the cervix is only operable when the disease does not extend beyond the uterus; and if the vagina, or broad ligament, or rectum, or bladder, or pelvic cellular tissues are involved, an operation is useless.

2. Amenorrhea is the absence of menstruation.

It is *physiological:* Before puberty, during pregnancy and early lactation, and after the menopause. Otherwise,

it is *pathological,* and may be due to: Absence or imperfect development of the generative organs; also to stenosis, obstructions, or atresia of the genital tract; also to operative removal of the uterus or its appendages. Other causative factors are: Acute infectious diseases, anemia, chlorosis, obesity, drug habits, alcoholism, overstudy, lack of exercise, exposure to cold and various emotional causes. When due to anemia, chlorosis, etc., it is said to be *constitutional.* Amenorrhea is also called *primary* when the flow has never been established; *secondary,* when it is suppressed.

3. It depends upon the situation of the tumor and the conditions present. The following procedures are possible: (1) The tumor may be pushed out of the pelvis; (2) expectant treatment may be instituted; (3) the tumor may be removed; (4) cesarean section may be performed.

4. To examine the pelvic floor, place the woman on her back on a table or across the bed, have her thighs well flexed and widely separated and buttocks projecting beyond the edge of the table or bed. An assistant (wearing sterile gloves) holds the labia apart, and the physician cleanses the parts with pledgets of sterile cotton, and also inserts the forefinger of the left hand in the rectum and the thumb in the vagina, so as to feel the thickness of the tissue between.

5.

APPENDICITIS.	TUBO-OVARIAN DISEASE.
1. No previous local disturbances.	1. Genitourinary functions previously disturbed. Usually a history of gonorrheal or puerperal infection.
2. Chill usually absent.	2. Chill may precede fever.
3. Pain in right iliac region, sudden onset, acute, and not radiating to thighs.	3. Gradual onset, pain dull, continuous, and radiating.
4. Fever of variable degree.	4. Fever often entirely absent.
5. Muscular rigidity on right side of the abdomen.	5. No muscular rigidity unless complicated by peritonitis.
6. Inflammatory exudate about appendix three to five days after onset of symptoms.	6. Inflammatory exudate in the pelvis felt by vaginal examination at the onset of the symptoms.
7. Vaginal examination is rarely painful in appendicitis.	7. Always painful in tubo-ovarian disease.

—(Findley.)

6. The pessary is only indicated in the absence of adhesions and inflammation, and when it can be worn without discomfort. "The vaginal pessary retains the uterus in place by raising the posterior vaginal fornix and keeping tense the posterior vaginal wall. The posterior wall of the vagina runs over the upper transverse bar of the pessary like a rope over a pulley; therefore there is maintained a continuous traction in an upward and backward direction upon the cervix, and a resulting continuous tendency to throw the fundus uteri in a forward position. The tension of the posterior vaginal wall and the traction upon the cervix vary with the position and occupation of the woman, and are increased by anything that increases the intraabdominal pressure. The vaginal pessary does not maintain the uterus in place by pressure upon the body of the uterus, nor does the vaginal pessary correct a retrodisplacement. The uterus should be restored to its normal position as nearly as possible before the pessary is introduced."—(Penrose.)

7. In the *menopause* there is cessation of menstruation; but none of the other signs of pregnancy. During the *first four months,* the following signs should be found: (1) Progressive enlargement of the uterus; (2) Hegar's sign; (3) Braxton Hick's sign; (4) uterine murmur; (5) cessation of menstruation; (6) changes in the breasts; (7) discoloration of the vagina and cervix; (8) pigmentation and striæ; (9) morning sickness.

8. From *a digital examination of the vagina* can be learned the presence or absence of vaginismus; the size, position, temperature, sensitiveness, moisture, and laxity of the vagina; the presence of foreign bodies, hernia, fissures, or carbuncles; the position, form and consistency of the cervix uteri; lacerations (including position, number, extent and direction), erosions, growths, or cysts on the cervix; prolapse, displacements and size and position of the uterus.

9

EXTRAUTERINE PREGNANCY.	OVARIAN CYST.
1. Rapid and regular growth.	1. Slower growth.
2. Amenorrhea, followed by menorrhagia, with discharge of pieces of decidua.	2. Menstruation not altered except occasionally in broad-ligament cysts.
3. General symptoms of pregnancy present, changes in color of vagina, etc.	3. Symptoms of pregnancy absent.

EXTRAUTERINE PREGNANCY.	OVARIAN CYST.
4. Enlargement of the uterus.	4. No enlargement of the uterus.
5. Attacks of pain increasing in severity, finally culminating in a very severe attack, followed by shock and symptoms of internal hemorrhage.	5. In small cysts; no attacks of pain except from pressure.
6. Pain is intermittent.	6. The twisted pedicle may cause sudden and acute pain.

—(From Wells.)

10. Normal menstruation is a periodic flow of blood and mucus from the uterine cavity of the adult female between the time of puberty and the menopause. It is absent during pregnancy and early lactation. The uterine mucous membrane becomes thick and swollen, the uterine glands become enlarged, the capillaries become hypertrophied; the capillaries then rupture and the epithelium is shed; afterwards the epithelium shrinks again, or is renovated.

11. PROLAPSUS UTER. *Etiology:* Injury at childbirth, lacerated perineum, relaxation and elongation of the ligaments of the uterus, loss of rigidity of the abdominal walls, increase in the weight of the uterus, subinvolution, increased intraabdominal pressure. *Treatment:* "A prolapsed uterus must first be placed in proper position, or a procidentia reduced. In many cases the introduction of a rubber ring pessary will then suffice to prevent recurrence. But it will often be found necessary to repair a torn perineum, removing at the same time redundant portions of the vaginal walls, before the ring will remain in the vagina. When such an operation is contraindicated, and the vaginal orifice is so wide that a ring cannot be kept in, some form of pessary with a vaginal stem and perineal bands will be required. In cases of procidentia, where the exposed surface is much ulcerated, the patient should be kept in bed, emollient applications made to the ulcers, and vaginal douches given. When the ulcers have healed, a pessary may be introduced. Procidentia due to supravaginal elongation of the cervix must be differently dealt with. Amputation of a portion of the cervix must therefore form the first step in the treatment, and it may be required also when the hyperplasia is secondary to descent. Cases of prolapse and procidentia which resist milder measures require further operative procedures, such as ventrofixation of the uterus or the shortening of the round ligaments. It is in cases of this kind that hysteropexy has often given satisfactory results. Total extirpation of the

uterus has been advised and practised for the treatment of procidentia."—(Sutton and Giles' *Diseases of Women.*)

12. The *Fallopian tubes* are about 4½ inches long, and extend from the cornua of the uterus outwards to the free surface of the ovary. The lumen of the tube is much greater at the ovarian end than at the uterine end. At the outer end it is surrounded by fringed processes called the fimbriæ. It lies at the upper edge between the two larger of the broad ligament.

The *ovaries* are almond shaped, about 1½ x ¾ x ½ inch; they are attached to the posterior layer of the broad ligament, at the outer end and a little below the Fallopian tube.

OBSTETRICS.

1. During pregnancy, the *blood* is increased in quantity, chiefly the fluid part and the fibrin making elements; the red cells and hemoglobin are relatively decreased, though absolutely increased; the white cells are increased. There is thus a physiological leucocytosis, an anemia and a hydremia.

2. At the pelvic inlet, the antero-posterior diameter is about 4 inches, the oblique diameter about 4½ inches, and the transverse diameter about 5 inches.

3. Empty the bladder and rectum; determine if there is a faulty presentation, as bregma, brow, or face. Measure diagonal conjugate and height of symphysis and determine the true conjugate. If this latter measures less than 2¾ inches in a simple flat pelvis, or 3 inches in generally contracted pelvis, the contraction is absolute, and only cesarean section or craniotomy is possible. Ascertain by palpation whether there is serious disproportion between head and pelvis. Malpresentations must be corrected with one hand in vagina pressing upward on the fetal anterior portion of the presenting part, and if possible drawing down in the occipital pole, aided by external manipulation. Press the head downward into the pelvis; this maneuver may be aided by Walcher's position. If there is marked disproportion, cesarean section and craniotomy must be considered. If disproportion is apparently not insuperable, rupture the membranes just after the acme of a pain, when the cervix is fully dilated, keeping the patient in Walcher's position. If the head thereupon engages during the next few pains, allow spontaneous delivery, or aid with forceps if necessary. If the head still refuses to engage, apply axis-traction forceps in Walcher's position, tentatively; if unsuccessful, perform podalic version by combined or internal method. If membranes have already ruptured, note whether there is marked retraction ring. If not, podalic version is proper, subject to limitation of slight disproportion; but if the uterus has retracted markedly, forceps, and

that failing, only cesarean section, symphyseotomy, or craniotomy is admissible.—(From Scott's *State Board Obstetrics.*)

4. *Episiotomy* is cutting the sides of the vulva so as to artificially enlarge the vulval orifice. The process is not generally advocated, and is practically abandoned.

5. To *resuscitate a new-born child:* Remove mucus, etc., from throat, slap the buttocks, rub the back and chest, immerse the body in warm water and pour cold water on the epigastrium, apply faradic current or electric brush, and try some method of artificial respiration.

6. *Application of hydrostatic Test.*—Having opened chest, note *position* of lungs (*before* respiration they occupy a small space at upper and posterior parts of thorax); their *volume* (of course increased after breathing); their *shape* (before respiration, borders sharp or pointed; after it, rounded); their *color* (before breathing, brownish-red; after it, pale red or pink), their appearance as regards disease and putrefaction; and whether they *crepitate* on pressure (as they will *after* respiration).

"Take out lungs, with heart attached, and place them in pure water having temperature of surrounding air. Note whether they float (high or low), or sink (slowly or rapidly). Separate them from the heart; weigh them accurately, and then place them in water again, and note sinking or floating as before. Subject each lung to pressure with the hand, and note sinking or floating again. Cut each lung in pieces and test floating again. Take out each piece, wrap it in a cloth, and compress with fingers as hard as possible, and test floating, etc., as before. The crucial test of *perfect respiration* is each piece floating after the most vigorous compression."—(King's *Manual of Obstetrics.*)

7. The essentials of conception are a live and healthy spermatozoon, a live and healthy ovum, the union of these two in a suitable medium (generally the Fallopian tube).

8. *Intrauterine causes of asphyxia:* Fetal inspiration; premature detachment of placenta; compression or prolapse of cord; excessive uterine contractions; hemorrhages; diseases of the fetus.

External causes: Precipitate labor; unruptured membranes; neglect of the infant.

9. The uterine cavity shrinks, the muscle fibers diminish in size, the blood-vessels and connective tissue and mucous membranes all diminish. Involution may take about six to ten weeks.

10. *Different methods of delivering the after-coming head:* Wiegand's method, Mauriceau's method, the Prague method, Deventer's method, and forceps.

11. *Version* is a process by which the presentation of

the fetus may be changed. In *postural version* the woman is put in a position in which the position of the child is influenced by the force of gravity. In *version by external manipulation* the obstetrician changes the position of the child by a series of movements exerted through the abdominal wall of the mother.

12. *Adherent placenta may be caused by:* Endometritis, syphilis, inflammation of the placenta.

HYGIENE.

1. (1) Careful disinfection or burning of sputum; (2) avoidance of spitting in public places; (3) plenty of fresh air and sunlight; (4) avoidance of kissing.

2. (1) The child should not sleep in the same bed with the parent; (2) the child should (if possible) have a sleeping room to itself; (3) avoidance of kissing; (4) the child should be kept in the open air and sunshine as much as possible, and should be well and suitably fed.

3. *Causes of mouth-breathing:* Adenoids, enlarged tonsils, tonsillitis, nasal obstruction. *Results:* Pigeon-breast, headache, snoring, earache and other ear affections, mental deficiency, frequent attacks of coryza, nose-bleed, stunted growth, convulsions, and the neuroses.

4. *The principal means of preventing the spread of contagious diseases in schools* are: Regular and efficient inspection by physicians; prompt exclusion and isolation of anyone suffering from a contagious disease, or coming from a house where such disease is; compulsory vaccination; compulsory notification of all infectious and contagious disease; individual towels, drinking vessels, and other implements; children who have had a contagious or infectious disease, or who have come from a house where such disease prevailed, should not be readmitted to school until sufficient time has elapsed since the occurrence of the last case to insure safety.

5. *Practical steps to prevent the spread of venereal diseases in a community:* (1) The scientific and practical control of prostitution (this is always opposed); (2) the education of the public on the dangers of venereal diseases (this is generally opposed); adequate instruction in hygiene in the public schools.

6. The cells should be disinfected after the removal of each prisoner; tuberculous prisoners should have their individual cups and eating utensils and implements; also cloths and towels for their own use; spitting should be prohibited except in receptacles specially provided for the purpose; sputum should be disinfected or burned.

7. The air should be filtered before it reaches the furnace.

8. *Hygienic advantages of automobiles over horses:* Ab-

sence of stables, manure, etc., flies; hence greater cleanliness and comfort, and less disease.

9. Candy is an important factor in the diet of the soldier on account of the sugar it contains. The sugar gives strength to muscles and helps to produce fat; it delays fatigue, and increases working power. After much hard work, sugar quickly revives and restores the jaded muscles.

Usual adulterations in candy: Terra alba, glucose, starch, cocoa butter, coloring agents.

10. The house fly is one of the commonest agents in the transmission of disease. *To prevent the breeding of flies,* keep the house and surroundings clean; cover up garbage, burn sputum, leave no dirt or manure in yard or stable. *To kill flies:* Catch them in traps or on fly-papers, and then burn them; or "swat" them.

11. *For milk:* The inspection should include: the color, reaction, specific gravity, sediment, taste, odor, acidity, total quantity of solids and of water; the percentage of cream, fats, lactose, casein and ash; the presence or absence of preservatives, coloring matter, added solids, dilution, pathogenic microorganism, dirt or other foreign matter. There should also be thorough investigation as to its source, the cows and their environment, the method employed in caring for, milking, storing, and transporting the milk.

12. All water for drinking or for washing dishes, etc., and milk should be boiled; no ice should be put *in* water or other drink or food; flies should be kept out of the house; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed, and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over.

STATE BOARD EXAMINATION QUESTIONS.

Colorado State Board of Medical Examiners.

ANATOMY.

1. Describe the radius, including the attachments of muscles and ligaments.

2. Describe the bones of the carpus.

3. Describe the ankle joint.

4. Describe the shoulder joint with special reference to its surgical anatomy.

5. Give the origin, insertion, and nerve supply of the following muscles: sartorius, gastrocnemius, serratus magnus, quadratus lumborum, flexor profundus digitorum.
6. Name the triangles of the neck and the important structures contained in each.
7. What muscles supinate the forearm? Give the origin and insertion of each.
8. Describe the large intestine, including relations.
9. What muscles derive their nerve supply from the anterior primary divisions of the fifth and sixth cervical nerves?
10. Give a brief description of the ducts that carry bile from the liver to the intestine.

PHYSIOLOGY.

1. In what part of the digestive tract is the pancreatic juice mixed with the food? What is its reaction? Name its ferment and what action does it have on food?
2. Give the function of (*a*) the cerebrum, (*b*) the cerebellum, (*c*) the external ear, (*d*) the mouth, (*e*) the spleen.
3. Give in detail the function and action of the liver and gall-bladder.
4. Describe the skin and mention three of its functions.
5. Name and describe the component parts of blood and by what organs it is distributed through the body.
6. Name five ductless glands. Tell where each is located and name their functions.
7. Name the three layers of the blastoderm and mention what parts of the adult are developed from each.
8. What does the sympathetic nervous system supply?
9. What five nerve centers are located in the lumbar enlargement of the spinal cord?
10. Name three nerves that supply motor impulses to the eye.

CHEMISTRY.

1. What is an alkaloid? Name three alkaloids used as medicines.
2. Name three of the halogen group. What are their chemical characteristics?
3. Enumerate the chemical constituents of normal urine.
4. Give the chemical formulæ of three common salts.
5. What do you understand by the term "chemical incompatibility"?
6. What is an acid salt?
7. What is neutral salt? Give two examples.
8. What is an alkaline salt?
9. What are the principal chemical constituents of normal gastric juice?

10. What is indican, and what is its significance when found in considerable quantity in the urine?

TOXICOLOGY.

1. Give symptoms of poisoning by sulphate of copper.
2. Give treatment of poisoning by sulphate of copper.
3. What are the symptoms of poisoning by tartar emetic?
4. How would you treat a case of poisoning by tartar emetic?
5. Give post-mortem appearance of poisoning by tartar emetic.
6. Give symptoms of poisoning by aqua fortis.
7. Give treatment of poisoning by aqua fortis.
8. What are the post-mortem appearances of poisoning by aqua fortis?
9. What are the symptoms of poisoning by aconite?
10. Give treatment of poisoning by aconite.

PATHOLOGY.

1. Classify tumors.
2. Discuss the gross pathology of congenital syphilis.
3. Describe the *Spirochæta pallida.*
4. What changes occur in the female genital apparatus from infection by the gonococcus?
5. Describe the Charcot joint.
6. What changes occur in the myocardium secondary to coronary disease.
7. How would you distinguish the tubercle bacillus from the smegma bacillus?
8. What changes occur when a peripheral nerve is cut?
9. Give the pathology of acute osteomyelitis.
10. Describe a peptic ulcer.

SYMPTOMATOLOGY.

1. What are the physical signs of lobar pneumonia?
2. What are the physical signs of bronchopneumonia?
3. What are the symptoms of diabetes mellitus?
4. What are the symptoms of rickets?
5. What are the symptoms of appendicitis, and what is the order of their appearance?
6. What are the physical signs of pericarditis?
7. What are the symptoms of arteriosclerosis?
8. Describe the blood picture in pernicious anemia.
9. What are the symptoms of Hodgkin's disease?
10. Name the various forms of nephritis and give the urinary findings in each.

OBSTETRICS.

1. Name indications for and give technique of the use of high forceps.

2. Mention the varieties of hemorrhage that may affect a parturient woman, and how would you treat them?
3. How would you diagnose the position of the child (outline form)?
4. What is placenta prævia, and how would you manage a case?
5. Give the (bony) measurements of the pelvis.
6. Give the average duration of labor in primiparæ and multiparæ.
7. Name the female organs of generation complete.
8. Mention some developmental abnormalities of the uterus.
9. Describe the ovum at the time of its discharge from the ovary.
10. Describe the migration of the ovum.

SURGERY.

1. Give the causes, symptoms, and diagnosis of fat-embolism.
2. What are the symptoms and complications of prostatic hypertrophy?
3. What are the causes and how would you determine the source of pus in the urine?
4. How should patients be prepared for the administration of anesthetics?
5. What complications may follow fractured ribs?
6. Give the varieties of hemorrhage and the methods of controlling it.
7. Give the causes of gangrene.
8. Describe Pott's fracture, the deformity that may follow, and the precautions to be taken in treatment.
9. Give the symptoms and prognosis of tuberculous peritonitis.
10. Describe the symptoms of a well developed tuberculous arthritis of the hip.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

COLORADO STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. "THE RADIUS is a long bone, shorter than the ulna, situated on the outer side of the forearm, the upper end small, the shaft slightly curved, and the lower end expanded to form part of the wrist-joint. It consists of shaft, upper and lower extremity. The *shaft* is prismoid, slightly curved, and presents: An *internal border,* sharp and prominent, for interosseous membrane; an *anterior border,* marked at its upper third by an *oblique line,* for

attachment of flexor longus pollicis, supinator brevis, and flexor sublimis digitorum; *anterior surface,* affords attachment above for flexor longus pollicis, below for pronator quadratus, and presents at the junction of middle and upper two-thirds a *nutrient foramen* directed upward; *posterior surface* gives attachment at upper third to supinator brevis, and at middle third to extensors of thumb.

"The *upper extremity* presents: *Head*—a cup-like cylindrical cavity, for articulation with capitellum of humerus, and on its side an articulating surface for lesser sigmoid cavity of ulna and orbicular ligament, which nearly surrounds it; *neck,* the constricted portion below the head; *bicipital tuberosity,* below and to inner side, divided by a vertical line into a rough surface posteriorly, for attachment of biceps tendon, and smooth surface anteriorly for bursa.

"The *lower extremity,* large, expanded, and quadrilateral, presents: *Carpal articular surface,* smooth, concave, triangular depression divided by an anteroposterior ridge into an outer facet for scaphoid bone and inner for semilunar; *sigmoid cavity,* a shallow concavity at inner side of carpal end, for articulation with ulnar head; *styloid process,* projects obliquely downward from the external surface, for attachment by its apex to external lateral ligament of wrist-joint, and by its base to insertion of supinator longus muscle. Its outer surface is marked by two *grooves* for extensors of thumb. The *posterior surface* of the lower extremity is also marked by three *grooves* from without inward for the following: Ext. carpi radialis longior and brevior in first, ext. secundi internodii in second, and ext. indicis, ext. communis digitorum, and ext. minimi digiti in third innermost. This surface has also attachment of posterior ligament of wrist."—(Young's *Anatomy.*)

2. The bones of the carpus are eight in number arranged in two rows of four each; the proximal row (from radial to ulnar side): Scaphoid semilunar cuneiform and pisiform; the distal row (similarly arranged): Trapezium, trapezoid, magnum, and unciform.

3. THE ANKLE-JOINT "is a ginglymoid articulation formed between the lower extremity and malleolus of tibia on the inner side, the malleolus of the fibula on the outer side, and the astragalus below. Its ligaments are anterior, posterior, external, and internal lateral. The *anterior tibiotarsal* ligament consists of a broad set of irregular fibers attached above to lower margin of tibia, below to astragalus. The *posterior tibiotarsal* ligament passes transversely between back part of tibia and astragalus. The *internal lateral,* or *deltoid,* has two layers—the superficial triangular, its apex arising from malleolus, its base spread out from before backward to be attached to scaphoid and in-

ferior calcaneoscaphoid ligament, the sustentaculum, and inner side of astragalus; and the deep, a short, round cord passing from internal malleolus to astragalus. The *external lateral ligament* consists of three distinct fasciculi, anterior, middle, and posterior, arising from near summit of external malleolus, and being inserted respectively into the front of astragalus, the outer surface of os calcis, and the back of astragalus."—(Young's *Anatomy.*)

4. THE SHOULDER-JOINT "is an enarthrodial joint formed above by the glenoid cavity of the scapula and below by the head of the humerus. Its ligaments are—glenoid, coraco-humeral, and capsular. The *glenoid* surrounds the edge, deepens the glenoid cavity, and is continuous above with the long head of the biceps tendon. The *capsular ligament,* extensive and loose, arises above it from circumference of glenoid cavity behind the ligament, is attached below to the anatomical neck of humerus, and is pierced by tendons of two or three muscles. The *coraco-humeral,* or *accessory,* is a fibrous band which extends obliquely downward and outward from the coracoid process to the anterior part of great tuberosity, strengthening the capsular ligament."—(Young's *Anatomy.*)

The *shoulder-joint is most liable to dislocation* on account of: (1) The shallowness of the glenoid fossa; (2) the large size of the head of the humerus; (3) great freedom of motion; (4) the thinness and laxity of the capsular ligament; (5) the joint depends on the surrounding muscles for its strength; (6) the long leverage of the arm; (7) its exposure to violence.

5. SARTORIUS. *Origin:* Anterior superior spine of ilium. *Insertion:* Upper internal portion of shaft of tibia. *Nerve supply:* Anterior crural.

Gastrocnemius. Origin: Condyles of the femur. *Insertion:* Os calcis (by tendo Achillis). *Nerve supply:* Internal popliteal.

Serratus Magnus. Origin: Eight upper ribs. *Insertion:* Inner margin of dorsal border of scapula. *Nerve supply:* Posterior thoracic.

Quadratus lumborum. Origin: Crest of ilium, transverse processes of lower three lumbar vertebræ. *Insertion:* Last rib, transverse processes of upper three lumbar vertebræ. *Nerve supply:* Twelfth thoracic and upper lumbar.

Flexor profundus digitorum. Origin: Shaft of ulna. *Insertion:* Last phalanges of fingers (by four tendons). *Nerve supply:* Ulnar, and anterior interosseous.

6. TRIANGLES OF THE NECK. *Inferior carotid triangle* contains: Common carotid and inferior thyroid arteries; internal jugular vein; vagus, recurrent laryngeal, and sym-

pathetic nerves; trachea; thyroid gland; and lower part of larynx.

Superior carotid triangle contains: Termination of common carotid, external and internal carotid arteries; superior thyroid, lingual, facial arteries and veins; internal jugular vein; vagus, superior laryngeal, hypoglossal and sympathetic nerves; upper part of larynx, and lower part of pharynx.

Submaxillary triangle contains: Submaxillary gland, facial artery and vein; submental artery, mylohyoid artery and nerve; lower part of parotid gland, facial nerve, external carotid, internal carotid, temporal, posterior auricular, and internal maxillary arteries; internal jugular vein, vagus, and sympathetic nerves.

Occipital triangle contains: Transversalis colli artery and vein; superficial cervical plexus and spinal accessory nerve; fat, and lymphatic glands.

Subclavian triangle contains: Part of subclavian artery; external jugular vein; brachial plexus; transversalis humeri and transversalis colli vessels; fat, and lymphatic glands.

7. ***Muscles that supinate the forearm:*** Supinator longus, biceps, brachialis anticus, supinator brevis, extensors of thumb.

SUPINATOR LONGUS. *Origin:* External condyloid ridge of humerus. *Insertion:* Styloid process of radius.

BICEPS. *Origin:* Glenoid cavity and coracoid process of scapula. *Insertion:* Tuberosity of radius.

BRACHIALIS ANTICUS. *Origin:* Lower half of anterior surface of shaft of humerus. *Insertion:* Coracoid process of ulna.

SUPINATOR BREVIS. *Origin:* External condyle of humerus and oblique line of ulna. *Insertion:* Neck of radius and its bicipital tuberosity.

8. The colon is divided into ascending, transverse descending, iliac, and pelvic.

The *ascending colon* extends from the cecum to the under surface of the liver to the right of the gall-bladder, where it turns to the left, forming the *hepatic flexure.* It lies in the right iliac and right hypochrondriac regions. The peritoneum covers the anterior and lateral surfaces. Length, 8 inches. *Relations.—In front:* The convolutions of the ileum; *behind:* Iliacus, quadratus lumborum, outer side of right kidney.

The *transverse colon* passes from right to left, from the gall-bladder to the spleen. It forms an arch, convex anteriorly and below: the *transverse arch of the colon.* It is entirely surrounded by peritoneum, which is attached posteriorly to the spine, forming the mesocolon. Length, 20 inches. *Relations.—Above:* Liver, gall-bladder, large cur-

vature of stomach, lower end of spleen; *below:* small intestines; *anteriorly:* anterior layers of great omentum, anterior abdominal wall; *posteriorly:* right kidney, second part of duodenum, transverse mesocolon, pancreas, and small intestines.

The *descending colon* passes from the end of the transverse colon by a bend, the *splenic flexure.* Between the splenic flexure and the diaphragm, opposite the tenth left rib, is a fold of the peritoneum, the *costocolic ligament,* which slings up the spleen. The gut then passes downward to the iliac crest, ending in the iliac colon. The peritoneum invests its anterior and lateral surfaces. Length, 4 to 6 inches. *Relations.—Behind:* left crus, left kidney, quadratus lumborum, and psoas; in *front:* small intestines; *inner side:* outer border of left kidney.

The *iliac colon* is continuous with the descending colon at the left iliac crest, and ends at the inner border of the left psoas. Peritoneum invests its anterior and lateral surfaces; it has no mesentery. Length, 5 to 6 inches. *Relations.—In front:* Small intestine; when distended, the anterior abdominal wall; *behind:* left iliopsoas.

The *pelvic colon* extends from the inner border of the psoas to the level of the third sacral vertebra. Length, 16 or 17 inches; very variable. It has an extensive mesentery. *Relations.*—Passing over left brim of pelvis, it crosses the left external iliac vessels and left ureter, and passes to right margin of pelvis, resting on bladder in male and uterus in female; above lie coils of small intestine. It then turns back to midline on posterior wall of pelvis, and, forming a second bend, descends to end in the rectum.—(From *Aids to Anatomy.*)

9. The supraspinatus, infraspinatus, subscapularis, teres major, teres minor, and deltoid muscles derive their nerve supply from the fifth and sixth cervical nerves.

10. The *hepatic duct,* formed by union of ducts from right and left lobes, issues from the liver at the bottom of the transverse fissure. It passes downwards and to the right in the layers of gastrohepatic omentum, having the vena porta behind, and the hepatic artery on the left. It joins the cystic duct, the two forming the common bile-duct.

The *cystic duct* passes from the neck to the gall-bladder downwards, backwards, and to the left, to join the preceding.

The *ductus communis choledochus* or *common bile-duct* is the result of the union of the hepatic and cystic ducts. It passes behind the first part of the duodenum, in front of the venæ portæ, with the hepatic artery on the left, between the layers of the gastrohepatic omentum, and, passing between the pancreas and second part of the duodenum, enters the small intestine obliquely, a little below the middle

of the descending part of the duodenum by an opening common to it and the pancreatic duct.—(From *Aids to Anatomy.*)

PHYSIOLOGY.

1. The *pancreatic juice* is mixed with the food, in the duodenum. The *reaction* is alkaline. The ferments are: *Trypsin,* which changes proteids into proteoses and peptones; and afterward decomposes them into leucin and tyrosin; *Amylopsin,* which changes starches into maltose and dextrose; *Steapsin,* which emulsifies and saponifies fats.

2. *Function of the cerebrum:* It receives all the afferent impulses which enter into consciousness; the sensation of heat, cold, pain, sight, hearing, smell, taste, hunger, thirst, all arise in the cerebrum; movement is also originated in the cerebrum.

Function of the cerebellum: Coordination of muscular movements, and maintenance of equilibrium.

Function of external ear: The auricle collects the sound waves and transmits them through the external auditory meatus to the external auditory canal, and these sound waves impinge upon the membrana tympani.

Function of the mouth: Prehension and mastication of food, its insalivation and deglutition, and beginning of the digestion of starches.

Function of the spleen: This is not definitely settled; the following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blod corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin.

3. The *functions of the liver* are: (1) the secretion of bile; (2) the formation and storage of glycogen; (3) the formation of urea and uric acid; (4) the manufacture of heat; (5) the formation of creatinine; (6) the production of antithrombin; (7) the conversion of poisonous and harmful into inert material; (8) it is also a reservoir for blood on its way to the heart.

The *function of the gall-bladder:* (1) To store the bile secreted in the liver; (2) to expel the bile into the duodenum.

4. The skin is composed of a deep portion, the corium, derma, or true skin; and of a superficial portion, the epidermis or cuticle.

The *corium* makes up by far the greater part of the skin, and within it are the perspiratory glands, the sebace-

ous glands, the hairs, together with both blood and lymphatic vessels. The upper surface, where it joins the epidermis, is irregular, being composed of elevations—papillæ—and intervening depressions. In some of these papillæ are the tactile corpuscles, in which nerve-fibers end.

The *epidermis* is made up of a deep and a superficial layer. The deep layer (rete mucosum or rete Malpighii) covers the papillæ of the corium and fills the depressions between them. It is composed of cells, round or of different shapes due to pressure of contiguous cells, the material of which they are composed yielding readily. It is in this layer that the pigment is deposited which characterizes the dark races. The superficial layer of the epidermis is composed of cells which are flat and dry or horny.—(Raymond's *Physiology.*)

Three functions of the skin: (1) Protection; (2) it is a specialized sense organ, for touch; (3) it helps in regulating the temperature of the body.

5. The *blood* is fluid, somewhat viscid, red, specific gravity from 1055 to 1062, alkaline reaction, saltish taste, characteristic odor, variable temperature (average about 100° F.). The *constituents* are plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteins, fat, and inorganic salts). The *white corpuscles* consist of water and solids (protein, leuconuclein, lecithin, histon, etc.). The *red cells* are biconcave discs, about 1-3200 of an inch in diameter; they are nonnucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They are elastic and soft, and their shape is changed by pressure, but is promptly regained on the removal of the pressure. Their color is yellowish. They contain hemoglobin. They carry oxygen from the lungs to the tissues. The white blood cells are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes; (2) large mononuclear; (3) transitional; (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their fate is uncertain; it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their functions are (1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation

of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (5) they help to maintain the proper proteid content of the blood plasma.

There are also *platelets,* which are very small, colorless, irregular shaped bodies; they are about one-fourth the diameter of a red corpuscle. The function is not determined; it is possible that they take some part in the coagulation of the blood. In number they vary from about 200,000 to more than 500,000 in each cubic millimeter of blood. *Plasma* conveys nutriment to the tissue; it holds in solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys. *Arterial blood* is bright red in color, contains more oxygen, less carbon dioxide, more water, and is slightly warmer; *venous blood* is purple in color, contains less oxygen, more carbon dioxide, less water, and is slightly cooler (except in the hepatic vein). It is distributed through the body by the heart, arteries, capillaries, and veins.

6. (1) The *spleen;* situated in the back part of the left hypochondriac and epigastric regions, being covered by the ninth, tenth, and eleventh ribs on the left side. (2) The *thyroid;* situated on the sides and in front of the upper part of the trachea, and extending upwards on each side of the larynx. (3) The *suprarenals;* situated in the back part of the abdominal cavity, behind the peritoneum, one on the upper extremity of each kidney, and slightly also on the inner and anterior surfaces. (4) The *carotid gland;* situated generally in the carotid bifurcation. (5) The *parathyroids;* on the postero-lateral surface of the lateral lobes of the thyroid gland.

For *function of spleen,* see above, QUESTION 2.

The function of the thyroid is not definitely settled; (1) it has some trophic function, regulating oxidation in the body, and it is supposed to have also a special influence on the vasomotor nerves, the skin, the bones, and on the sexual functions; (2) it is supposed to antagonize toxic substances, and (3) it produces an internal secretion.

The *function of the thymus* is not settled; it is said: (1) To be a blood-forming organ; (2) to have influence on growth and nutrition; (3) in hibernating animals it is supposed to store up materials which can be utilized during the period of inactivity.

The *function of the suprarenals* is not definitely settled; they produce an internal secretion which is probably necessary to life; it is supposed that they are able to destroy or remove some toxic substance produced elsewhere in the body.

The function of the *other ductless* glands is unknown. They all, or nearly all, furnish an internal secretion.

7. *The three layers of the blastoderm* are: The epiblast, mesoblast, and hypoblast.

From *the epiblast* are derived: The skin, and its appendages (hair, nails), and glands (including the mammary glands); the nervous system (brain, spinal cord, ganglia and nerves); the epithelial parts of the organs of special sense.

From *the mesoblast* are derived: The skeleton; connective tissues; muscles and bones; heart, blood-vessels, lymphatics, and spleen; the urinary and generative organs. From *the hypoblast* are derived: The epithelial lining of the alimentary canal and its glands; the epithelial lining of the respiratory tract, Eustachian tube, thyroid and thymus.

8. The *functions* of the sympathetic nervous system: "It may safely be said that sympathetic system has, to a great extent, a controlling influence over the secretion of most of the glands, the lacrymal, the salivary, the sweat glands, the glands of the stomach and intestines, the liver, the kidney, etc.; that it presides over the circulation by regulating the caliber of the blood-vessels and the action of the heart; that it influences respiration; and, finally, that all involuntary muscles, those of the digestive apparatus, of the genitourinary system, of the hair follicles (pilomotor-nerves), are under its control to such extent that, for instance, in certain mammalians the bladder still continues to fulfill its function for weeks after all the cerebrospinal motor nerves leading to it have been severed. In short, we find that all vegetative life of the organism is, to a greater or lesser extent, under the control of the sympathetic system. Therefore it may properly be called the vegetative nerve system *par excellence.*"—(*Reference Handbook of the Medical Sciences.*)

9. *Nerve centers located in the lumbar enlargement of the spinal cord are:* Centers for urination, defecation, parturition, erection of the penis, and ejaculation of seminal fluid.

10. *Three nerves that supply motor impulses to the eye:* (1) Motor oculi, or 3rd cranial; (2) trochlear, or 4th cranial; and (3) abducens, or 6th cranial.

CHEMISTRY.

1. An *alkaloid* is a basic, nitrogenous, organic substance, of alkaline reaction, and capable of combining with acids to form salts in the same way that ammonia does.

Three alkaloids used in medicine: Strychnine, quinine, and morphine.

2. *Three of the halgen group:* Fluorine, chlorine, and bromine.

They are all univalent elements, they all unite with hydrogen to form hydracids; their hydroxides (but fluorine does not form one) are monobasic acids; they are all extremely irritant; and they possess bleaching and disinfecting properties.

3. *Chemical constituents of normal urine:* Water; urea, uric acid, hippuric acid, creatine, creatinine, xanthine, hypoxanthine; chlorides, sulphates, and phosphates (of sodium, potassium, magnesium, and calcium), ammonia.

4. Sodium chloride, NaCl; silver nitrate, $AgNO_3$; and borax, $Na_2B_4O_7$.

5. *Chemical incompatibility* is that form of incompatibility in which chemical interaction (generally not intended by the prescriber) results; the ingredients undergo a chemical change, and a new chemical compound results.

6. An *acid salt* is one in which only part of the replaceable hydrogen of the acid has been replaced by a metal (or its equivalent), as $KHSO_4$.

7. A *neutral salt* is one in which all of the replaceable hydrogen of the acid has been replaced by a metal (or its equivalent), as K_2SO_4, $Ca_3(PO_4)_2$.

8. An *alkaline salt* is a basic salt, that is a compound of the normal salt with a hydroxide, or oxide of the metal.

9. *The principal chemical constituents of normal gastric juice* are: Water; pepsin; hydrochloric acid; chlorides (of sodium, potassium, calcium, and ammonium); and phosphates (of calcium, magnesium, and iron).

10. *Indican* is indoxyl potassium sulphate. When found in considerable quantity in the urine it may denote: Putrefactive changes in the body, or hypochlorhydria, or gastric ulcer or diminished peristalsis in the small intestine.

TOXICOLOGY.

1 and 2. COPPER SULPHATE (ACUTE). *Symptoms:* "A 'coppery' taste, soon followed by nausea and vomiting, which becomes violent and persistent (the vomited matters being colored blue or green, according to the amount taken and the contents of the stomach), severe pain in the stomach and bowels, with flatulence and eructations. There is generally some diarrhea, the stools black or reddish brown, and streaked with blood. The pulse is small, sharp, rapid, and sometimes irregular, the skin cold and clammy, thirst burning and persistent, great prostration, dyspnea, urine scanty and voided with difficulty and pain. In the later stages neurotic symptoms appear, vertigo, cramps, tetanic spasms, paralysis, coma and collapse. In some cases there is salivation, and, if the case continues, jaundice appears, thus distinguishing this from mercurial or arsenical poisoning."

Treatment: "Encourage vomiting with copious draughts

of warm water, or wash out stomach with solution of potassium ferrocyanide. Give albumin (eggs), milk, diluent drinks, calcined magnesia, or other alkalies, or soap. It is not best to give oils."—(Riley's *Toxicology.*)

3, 4, and 5. TARTAR EMETIC. *Symptoms:* "These are seldom delayed more than half an hour. Nausea, violent and continual vomiting, burning pain in stomach and bowels, with an acrid, burning sensation in the throat, are usually the first symptoms. Then purging, intense thirst, feeble, rapid pulse, cramps in legs, and general lowering of the temperature, with great prostration, follow. The coldness extends even to the internal organs. The bowels become tympanitic. The spinal centers are greatly depressed. The urine is generally increased, but sometimes diminished or suppressed, and may be bloody and passed with difficulty and pain. Delirium and convulsions may precede death, or the patient may sink into coma, or die from exhaustion. The progress of the case often resembles arsenical poisoning so closely that it is difficult to decide which it is without chemical analysis. Generally, however, the persistent nausea and vomiting will distinguish between them. Sometimes neither vomiting nor purging is seen. In such cases the patient is apt to collapse, with cold sweat, feeble respiration, cyanosis, delirium, irregular pulse, and lapse into unconsciousness and die in convulsions."

Treatment: "Wash out the stomach or assist vomiting by abundant warm demulcent drinks. Then give tannin in some form. As the poison is quite rapidly absorbed, promptness is important. It is well in washing out the stomach to use some form of tannin solution, as tea, infusion of oak bark, etc., if available. Borax in milk (5 per cent. solution) has been used with much apparent success. Then sustain the heart with strychnine hypodermically, digitalis or strophanthus. If nausea is persistent opiates may be necessary."

Post Mortem Appearances.—"The mucous membranes of the throat, stomach and bowels are usually red, softened, and show general signs of severe irritation or even inflammation. They (especially those of the stomach), are apt to be covered with small extravasations of blood and occasionally pustular eruptions. The mucous membrane of the bowels is frequently covered with a dark yellowish, viscid secretion. The brain and lungs are generally congested. In chronic cases the large intestine is also inflamed and the liver enlarged and softened."—(Riley's *Toxicology.*)

6, 7 and 8. AQUA FORTIS. *Symptoms:* Sudden and acute burning pain in epigastrium and extending from mouth to stomach; violent and distressing vomiting of acid and dark material. Eschars where the acid has come in con-

tact with skin, lips or tongue; these are first white, then yellow or brown.

Treatment: Magnesia suspended in water, or a strong solution of soap. Do *not* use the stomach tube.

Post mortem appearances: "The mucous membrane of the mouth and throat is yellow. The stomach is distended with gas, if not perforated, and patches of yellow, brown or green are seen on its internal surface. Perforation is not common. The mucous membrane of the intestines is frequently grayish white or bluish. The kidneys are inflamed and swollen and the liver degenerated in protracted cases. Evidences of inflammation of the lungs are frequently found."—(Riley.)

9 and 10. "*The symptoms of poisoning by aconite* usually manifest themselves within a few minutes; sometimes are delayed for an hour. There is numbness and tingling, first of the mouth and fauces, later becoming general. There is a sense of dryness and of constriction in the throat. Persistent vomiting usually occurs, but is absent in some cases. There is diminished sensibility, with numbness, great muscular feebleness, giddiness, loss of speech, irregularity and failure of the heart's action. Death may result from shock if a large dose of the alkaloid be taken, but more usually it is by syncope.

"The *treatment* should be directed to the removal of the unabsorbed poison by the stomach tube, and washing out of the stomach with infusion of tea holding powdered charcoal in suspension. Stimulants should be freely administered." (Witthaus' *Essentials of Chemistry.*)

PATHOLOGY.

1. A *tumor* is a pathological new growth which tends to persist independently of the structures in which it lies, and which performs no physiological function.

Tumors are classified as follows:

I. Those derived from mesoblast:
   (*a*) *Benign:* Lipoma, fibroma, chondroma, osteoma, myxoma, myoma, neuroma, glioma, angioma, lymphangioma.
   (*b*) *Malignant:* Sarcoma.

II. Those derived from epiblast or hypoblast:
   (*a*) *Benign:* Adenoma, papilloma.
   (*b*) *Malignant:* Carcinoma.

III. Cystic tumors.

IV. Teratomata.

2. *Congenital syphilis:* "Syphilitic lesions may be found in the new-born, or may develop some time after birth. Not rarely they occur in the new-born fetus, and cause its premature death. Frequently there is maceration of the fetus prior to expulsion. Among the lesions observed,

sclerotic changes in the lungs, liver, spleen, pancreas, and other organs are conspicuous; and a certain condition of the bones is quite characteristic. The latter consists of a hyperplasia of connective tissue and fatty degeneration at the junction of the epiphyses of the long bones with the shafts. Various superficial lesions of the skin in the form of vesicles or bullæ, fissure, and the like may be observed. The blood may present considerable excess in the number of leucocytes. An almost distinctive condition of second dentition is that known as Hutchinson's teeth. This consists of a notched indentation of the cutting surface of the upper central incisors. In addition the teeth are often wedge-shaped and peg-like."—(Stengel's *Pathology.*)

3. The *Spirochæta pallida* is a slender spirillum, with regular turns, the curves varying in number from three or four to twelve or even twenty; it is about 4 to 20 mikrons long, actively motile, with a fine flagellum at each pole; it is flexible, hard to stain, and has not been cultivated on artificial media. How it divides is not known. It stains best with Giemsa's eosin solution and azur. It is the microorganism found in syphilis.

4. Vulvitis, vulvo-vaginal abscess, vaginitis, endocervicitis, endometritis, salpingitis, pyosalpinx, and ovaritis.

5. Charcot's joint is a neuropathic arthritis. It occurs in two chief forms: (1) In the *atrophic* variety, the more common, the bones become eroded to a considerable extent, the ligaments stretched, and a weak, flail-like articulation remains, in which the ends of the bones are atrophied and displaced. (2) In the *hypertrophic* form new osseous formations occur here and there under the synovial membrane, especially in cases where there is much distension, so that on compression of the swelling between the hands a sensation is produced similar to that imparted by grasping a bag of bones. After a time these osseous masses become welded together, giving rise to large overgrowths, which lead subsequently to fixation of the joint. The disease sometimes runs a more chronic course, and then closely resembles osteoarthritis, since there is but little effusion, whilst the ends of the bones become eroded, and osteophytes, perhaps of great size, form around the edges of the cartilages, leading to defective mobility and crepitus. —(Rose and Carless' *Surgery.*)

6. Infarction, degenerative changes and necrosis in the myocardium.

7. The *smegma bacillus* is decolorized by a dilute mineral acid, also by heat and alcohol; the *tubercle bacillus* is not decolorized by either of these.

8. "When a nerve is divided the first result is a loss of its function. Inasmuch as each nerve-fiber develops from a cell which later nourishes it, if the connection between

the two is severed the nerve-fiber undergoes Wallerian degeneration, and in the case of a nerve which is made up of nerve-fibers the whole nerve undergoes this change. This degeneration consists, in the case of medullated nerves, in the death of the axis-cylinder, the breaking up of the medullary sheath into drops of myelin, which are later absorbed, and the multiplication of the nuclei of the primitive sheath. In non-medullated nerves the only result is the death of the axis-cylinder. Degeneration begins very soon after the section—within a day or two—and throughout the entire severed portion of the nerve at the same time. Thus the course of a nerve, or a collection of nerves, may be traced throughout its entire extent. These changes are believed to be due to the severance of the nerve from its trophic center. If an anterior root of a spinal nerve is divided, the distal end, being separated from the gray matter of the cord which is its center of nutrition, undergoes degeneration, while the end which remains connected with the cord retains its integrity. If a posterior root is divided between the cord and the ganglion, the degeneration takes place between the cord and the ganglion; while if divided below the ganglion, the degeneration takes place in that portion separated from the ganglion, showing that the ganglion is the nutritive center for the posterior root." (Raymond's *Physiology.*)

9. *Acute osteomyelitis:* "The marrow first becomes red and edematous, then cellular infiltration and proliferation are superadded, and finally collections of pus or diffuse purulent transformation follow. The surrounding bone is involved, becoming more or less infiltrated, softening, and not rarely undergoing necrosis. Small or large sequestra may be formed, or the bone may necrose completely. Periostitis is generally associated, and the tissues around the bone are usually infiltrated and suffer suppurative or necrotic changes. Hypertrophic changes may occur in the periosteum and superficial layers of bone, causing a bony encasement of central sequestra. In such instances a suppurating sinus, extending from the bone to the surface, usually remains."—(Stengel's *Pathology.*)

10. *Peptic ulcer* "is a peculiar form of ulceration generally found in the posterior wall in the lesser curvature at the pyloric end of the stomach, and probably due to the action of the gastric juice upon diseased tissue. It is thought to be due to a thrombosis in a vessel giving rise to a local area of necrosis, which, being no longer able to resist the action of the gastric juices, undergoes digestion. Infection, embolism, infarction, spasmodic contractions of the blood-vessels, are all thought to have some bearing upon the formation of these ulcers. They are found most frequently in chlorotic girls in whom there is an associated

increase in the acidity of the gastric juice. The peptic ulcer is usually single and small, but is sometimes multiple and large. It is generally round or slightly oval, 2 to 4 cm., wider at the top than at the bottom, and is accompanied by very little inflammation. The mucous layer alone may be involved, or the destruction may extend to the submucosa, the muscularis, or even to the serous covering. In healing there is cicatricial tissue formed which on contracting gives rise to a peculiar white stellate scar. If the ulcer was in the region of the pylorus, stenosis of that outlet may result. From the floor of the healed ulcer carcinoma sometimes develops. The two dangerous results are perforation or hemorrhage. The perforation is usually smooth and round and looks as if it had been punched out. Sometimes there have been adhesions to neighboring organs, so that damage is prevented, but more frequently the gastric contents will escape into the abdominal cavity and give rise to peritonitis. Hemorrhage is the result of ulceration of a large arterial branch. This is more common than perforation. The amount of blood lost may cause death or there may be merely a constant oozing. Peptic ulcers sometimes occur in the upper end of the duodenum close to the pyloric orifice and also in the lower portion of the esophagus."—(McConnell's *Pathology.*)

SYMPTOMATOLOGY.

1. *Physical signs of labor pneumonia. Inspection* reveals during the first stage deficient movement of the affected side, due to pain. The apex-beat is normal in situation, and the interspaces do not bulge. In the second stage the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air the diaphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiration).

Palpation during the first stage shows the vocal fremitus to be more distinct than normal, especially over the diseased portions. In the second stage the vocal fremitus is markedly exaggerated, except in those rare instances of occlusion of the bronchi by secretion. The cardiac impulse is felt in the normal position.

Percussion: In the first stage the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage there is dullness over the affected parts, with an increased sense of resistance. Over unaffected adjoining areas the resonance is increased (Skoda's resonance).

Auscultation: In the first stage there is heard over the affected part a feeble vesicular murmur, associated with

the true vesicular or crepitant (crackling) râle, heard at the end of inspiration only. In the second stage there is harsh, high-pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion. Bronchophony, or distinctly transmitted voice, is present and at times pectoriloquy, or distinct transmission of articulated sounds, may be heard. In the third stage the breathing changes from bronchial to bronchovesicular and the crepitant râle (crepitatio redux) returns. As resolution proceeds the breath sounds are associated with large and small moist and bubbling râles.—(Hughes' *Practice of Medicine.*)

2. *Physical signs of bronchopneumonia: Percussion* yields dullness in scattered areas over both lungs, the intervening healthy lung often giving a more or less hollow or tympanitic note.

Auscultation reveals vesico-bronchial breathing, changing to moist bronchial breathing, associated with small bubbling (subcrepitant) râles. As the disease progresses toward resolution the râles become larger (larger bubbling) and more numerous. If pneumonic phthisis result physical signs indicative of that condition are soon evident.—(Hughes' *Practice of Medicine.*)

3. *Symptoms of diabetes mellitus:* Insidious onset, weakness, large appetite, thirst, polyuria with high specific gravity and sugar, itching.

4. *Symptoms of rickets:* Large square head, bead-like prominences on the ribs, prominent sternum and abdomen, enlarged epiphyses and bending of tibiæ, bent femur, waddling gait, profuse sweating.

5. Pain and tenderness over right iliac fossa, malaise, constipation or diarrhea, poor appetite, nausea, vomiting, fever, hiccough.

6. *Physical signs of pericarditis: Inspection* during the early stage shows excited cardiac action as evidenced by the impulse. During the effusion stage the impulse is feeble, undulatory, or absent; it is usually displaced upward, very rarely downward, the precordium bulges, and the abdomen protrudes when the effusion is large.

Palpation during the early stage serves to detect an excited or tumultuous impulse, and in very rare instances pericardial friction fremitus. During the effusion stage the impulse is feeble or absent, and when present is considerably displaced. Tenderness may be elicited.

Percussion is normal in the beginning of the disease, but as the effusion forms the cardiac dullness becomes enlarged vertically and laterally.

Ausculation at the onset reveals excited cardiac action and usually an exocardial murmur or friction sound, syn-

chronous with the cardiac sounds and uninfluenced by respiration but often increased by pressure with the stethoscope. Later as the effusion forms the cardiac sounds are feeble and deep-seated at the apex, becoming louder and distinct toward the cardiac base. The friction sound is sometimes heard at the base. As absorption progresses the friction sound returns, being replaced shortly by the normal heart sounds.—(Hughes' *Practice of Medicine.*)

7. *Symptoms of arteriosclerosis:* Increased arterial tension; hard, prominent, tortuous superficial vessels; hypertrophy of left ventricle with dyspnea and palpitation; angina pectoris; arcus senilis; vertigo; headache; insomnia; numbness of extremities.

8. In *pernicious anemia* the blood would show: (1) A diminution in the number of red corpuscles; (2) a relative increase in the amount of hemoglobin; (3) poikilocytosis; (4) the presence of nucleated red cells; (5) variation in the size of the red cells; (6) the leucocytes *may be* diminished.

9. Hodgkin's disease is characterized by hyperplasia of the lymphatic glands and progressive anemia; there is no great excess of white corpuscles. The glands of neck, axilla, and groin are enlarged; anemia is present; the swellings are painless and do not, as a rule, suppurate; dyspnea may ensue; spleen and thyroid are apt to become enlarged; palpitation, shortness of breath, and hemic murmurs may be found. *Prognosis* is unfavorable; recovery is rare; cases may last from six months to three or four years.

10. See table, p. 92.

OBSTETRICS.

1. *Indications for the use of forceps* are: (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipitoposterior, (*b*) mentoanterior face, (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute). (4) *Accidental complications:* Hemorrhage: prolapsed funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both. *Conditions necessary for the use of forceps* are: (1) The rectum and bladder must be empty; (2) the os uteri must be fully dilated; (3) the membranes must be ruptured; (4) the pelvis must be of sufficient size.

2. The hemorrhages that may affect a parturient woman are those caused by: (1) Placenta prævia; (2) premature

ACUTE NEPHRITIS.	CHRONIC NEPHRITIS.		
	Chronic parenchymatous nephritis; large white kidney.	Secondary contracted kidney; small white kidney.	Chronic interstitial nephritis; primary contracted or small red kidney; cirrhotic or granular kidney.
URINE. *Quantity.* Scanty.	Rather less than normal...	Not less than normal; usually increased.	Very abundant.
Color. Turbid, pale red or smoky to deep red.	Turbid, resembling meat infusion.	Fairly clear.....	*Clear,* pale.
Specific Gravity. High....	Somewhat raised, may be normal.	A little below normal.....	Low.
Blood. Abundant.....	Commonly present.....	In small quantity.....	Usually *absent.*
Albumin. Abundant.....	Abundant	In moderate quantity.....	In very small quantity; may be absent for some time.
Sediment. Abundant. White and red corpuscles; blood casts, epithelial and granular casts; urates.	Abundant. White and red corpuscles; numerous casts, especially *fatty*. ..	In moderate quantity. Casts fairly numerous, granular and hyaline chiefly.	Very scanty. Casts few, chiefly hyaline.
Salts and Urea. Marked diminution of urea, chlorides, and phosphates.	Diminution of urea, etc.....	Marked diminution of urea, etc.	Marked diminution of urea, etc.

separation of a normally situated placenta; (3) relaxation of the uterus; (4) laceration of the cervix; (5) rupture or inversion of the uterus; (5) retained secundines; (6) displaced uterus; (7) displaced thrombi; (8) fibroid tumors; (9) hypertrophied decidua; (10) carcinoma.

"In the presence of actual hemorrhage the treatment varies according as the placenta is still within the uterus or has already been expelled. In the former case the uterus should at once be grasped through the abdominal wall and firmly kneaded. If firm contractions come on all is well, but if the hemorrhage continues and the uterus relaxes as soon as the kneading is stopped the placenta should be expressed by Credé's method; and if this cannot be accomplished and the patient's condition is alarming manual removal may become necessary. . . . If the hemorrhage does not cease after the delivery of the placenta the cause should be ascertained and suitable treatment instituted. Tears should be located and their edges brought together by sutures. On the other hand, if the hemorrhage is the result of the retention of placental tissue the carefully disinfected hand should be carried up into the uterus in order to seek for and remove the retained cotyledon. Under such circumstances the hand acts as a most efficient irritator, causing the uterus to contract energetically. After separating the retained portion of the placenta the hand should not be withdrawn at once, but should be allowed to recede gradually as it is forced down by the contraction of the fundus. If the hemorrhage is due to atony the uterus should be vigorously kneaded and from 40 to 60 minims of ergot or of ergotol administered hypodermically. . . . If these measures are not attended with the desired result a very hot intrauterine douche of several liters of sterile salt solution should be employed. . . . If the hemorrhage persists in spite of the douche our only hope of controlling it is by packing the uterus tightly with sterile gauze. Before resorting to the use of the pack it is always advisable to palpate the interior of the uterus, as occasionally a portion of the placenta may have been retained, even though immediately after expulsion the organ may have apparently been entire."—(Williams' *Obstetrics.*)

3. *To outline the position of the child:* "The woman, after having her bladder emptied and the rectum thoroughly evacuated either by an enema or purgative, lies on a bed with limbs extended, the abdomen being covered only by a sheet. The physician, standing at the side of the bed, places his hands with the palms together, the ulnar side down, the finger tips being immediately above the mons veneris. The hands are now gradually separated and passed upward along the abdomen, gently pressing

and outlining the fetus between them. The head can be recognized as a hard globe, more or less movable; the breech as a larger, less movable, body, at some distance from the head; in its neighborhood small movable bodies, the feet, can be felt. Between the head and the breech a ridge, hard and little movable, can be made out; this is the back of the fetus."—(Landis' *Obstetrics.*)

4. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Treatment:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. : *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

5. *Measurements of diameters of pelvis:*

	ANTERO-POSTERIOR.	OBLIQUE.	TRANSVERSE.
Brim	4 inches	4½ inches	5 inches
Mid-plane	4½ "	4½ "	4½ "
Outlet	5 "	4½ "	4 "

6. The *average duration of labor* in *multiparæ* is about ten or eleven hours; in *primaparæ*, is about fifteen hours.

7. Ovaries, Fallopian tubes, uterus, vagina, labia majora, labia minora, fourchette, vestibule, elitoris, mons veneris (vulva).

8. Uterus may be: Double, septate, bicornis, duplex, cordiformis, absent, rudimentary, didelphys, infantile, atrophied.

9. "The *ovum,* when fully developed, is a spherical mass of protoplasm 1/120 of an inch in diameter. It is structureless, except that it contains at one point a small body like a nucleus, called the germinal vesicle, which in turn contains a smaller body, like a nucleolus, called the germinal spot. The ovum is surrounded by a thin envelope of albuminous matter called the zona pellucida, or vitelline membrane, but which is not a distinct membrane until after impregnation, the ovum itself being called also the vitellus or yolk."—(Landis' *Obstetrics.*)

10. *Migration of the ovum:* "After the ovum is discharged from the ovary it is caught in a current of fluid moistening the surface of the ovary and is carried to the interior of the corresponding tube. The existence of this current of fluid is explained by the movement of the ciliated epithelium in the tube. Arrived in the tube, the ovum is transported to the uterine cavity by the movement of the cilia on the epithelium and by the vermiform move-

ments of the tubal walls. In certain cases of extra-uterine pregnancy an anomalous transmigration of the ovum has been demonstrated. Thus it is possible for the ovum, after its discharge from the ovary, to be taken up by the fimbriated extremity of the opposite tube—an external transmigration of the ovum. It is also possible for the ovum to traverse one tube and the uterine cavity and to enter the uterine ostium of the opposite tube—an internal transmigration of the ovum."—(Hirst's *Obstetrics.*)

SURGERY.

1. *Fat embolism:* "After various injuries and operations, but especially such as implicate the marrow of long bones—for example, comminuted fractures, osteotomies, resections of joints, or the forcible correction of deformities—fluid fat may enter the circulation in variable quantity. In the vast majority of cases no ill effects follow, but when the quantity is large or when the absorption is long continued certain symptoms ensue, either immediately, or more frequently not for two or three days. These are mostly referable to the lungs and brain.

"In the lung the fat collects in the minute blood-vessels and produces venous congestion and edema, and sometimes pneumonia. Dyspnea, with cyanosis, a persistent cough and frothy or blood-stained sputum, a feeble pulse and low temperature, are the chief symptoms.

"When the fat lodges in the capillaries of the brain, the pulse becomes small, rapid, and irregular, delirium followed by coma ensues, and the condition is usually rapidly fatal.

"Fat is usually to be detected in the urine, even in mild cases." (Thomson and Miles' *Surgery.*)

2. PROSTATIC HYPERTROPHY. *Symptoms:* (1) Difficulty in Micturition.—A long time is taken in starting the stream. The stream is of good bulk but slow, and projected with little or no force. Straining often checks the stream. (2) Frequency of Micturition.—Due at first to congestion and irritability of the neck of the bladder, later to retention. Worse at night, or most noticeable then. (3) Retention of Urine.—The bladder cannot empty itself when the obstruction increases or when the bladder becomes weak. Hence some residual urine is left after each act. This varies from one to ten ounces, and constitutes the measure of the inefficiency of the bladder. Acute retention may be the first sign, or more commonly supervenes on chronic retention when micturition has been delayed so long that the bladder becomes atonic, or results from congestive spasm caused by cold or alcoholic excess. False incontinence (retention with overflow) may supervene in any

neglected case. (4) Chronic Cystitis.—Infection is usually by instruments. May arise by autoinfection. Urine becomes ammoniacal and loaded with phosphates, pus, and mucus.

Complications: Retention, cystitis, calculi, hematuria, urethritis, and prostatic abscess.

3. *Pus in the urine.* "The presence of pus in the urine is termed *pyuria* and usually indicates suppuration along the genitourinary tract. Its source may be detected to a great extent by the time of its appearance (as with blood) in the urine. When present in the early part of micturition the urethra is usually diseased, if at the end and in alkaline urine the trouble is in the bladder, but if it is freely admixed with an acid or neutral urine, the probabilities are that the kidneys are at fault. The addition of an equal quantity of a solution of potassium hydroxid to urine containing pus gives rise to the formation of a viscid gelatinous mass. The microscope may also be employed to detect pus." (Hughes.)

4. *Preparation for anesthesia:* If possible, the patient should be under observation for a day before operation. The heart, lungs, and kidneys should be examined. A purgative should be given the night before, and an enema the morning of the operation. Hot broth or beef-tea is given for breakfast on the morning of the operation. The patient is placed in the recumbent posture, with the clothing loosened about the neck, and all articles, including artificial teeth, removed from the mouth. The bladder should be emptied just before the anesthetic is given.

5. *The complications that may follow fractured ribs* are: "Additional injury, making the fracture externally or internally compound; laceration of the pleura, pericardium, heart, lung, diaphragm, liver, spleen, or colon; rupture of an intercostal artery; hemothorax; cellular emphysema; pulmonary emphysema; pneumothorax; pyothorax; traumatic pleurisy; pneumonia; bronchitis; congestion or edema of the lungs." (Da Costa's *Surgery.*)

6. *Varieties of hemorrhage:* Arterial, venous, capillary, concealed, external, primary, secondary, intermediate. *Methods of controlling it:* Ligatures, position, cold, heat, pressure, forced flexion, styptics, cautery, torsion, suprarenal extract, acupressure.

7. *Causes of gangrene:* Deficient blood supply, weak vessels, embolus, thrombus; direct violence from physical or chemical agents.

8. *Pott's fracture* is very common, and is due to indirect violence, such as turning over on the inside of the foot. The strain tears through the internal lateral ligament of the ankle or tears off the tip of the malleolus; then the astragalus is pressed against the inner side of the ex-

ternal malleolus by the continuation of the violence. The fibula is overbent, and breaks about 3 inches above the tip of the malleolus. At the same time the foot is displaced outwards or outwards and backwards. *Treatment:* An anesthetic should always be given, and the fracture reduced by relaxing the calf muscles and applying traction to the foot. The limb must then be fixed on a back-splint, with side-splints in addition. The foot must be at right angles to the leg, the bony points in line, and the posterior displacement corrected. The surest way of maintaining the foot in good position is to at once apply plaster of Paris. Other splints used are Dupuytren's and Syme's horseshoe splint. Massage and passive movement at the end of ten days are advisable, the fragments being firmly grasped to prevent displacement.—(*Aids to Surgery.*)

9. TUBERCULOUS PERITONITIS. *Symptoms:* Poor general health, alternate constipation and diarrhea, abdomen is tender, pain is present in abdomen, wasting is marked, loss of appetite, ascites may be present, enlarged lymphatic glands may be present. *Prognosis:* Bad.

10. TUBERCULOUS ARTHRITIS OF HIP. *Symptoms of first stage:* Night cries; lameness in the morning; a slight limp; tendency to become tired on slight exertion; wasting; spasm; pain; swelling; and deformity (either real or apparent).

Symptoms of second stage: Abduction, limping, pain, which is worse at night, apparent lengthening of the limb, abscess, atrophy of thigh muscles, flexion of thigh, effusion into hip joint, and there may be crepitation in the joint.

Symptoms of third stage: Flexion, adduction, and shortening of the limb, the joint may be dislocated or ankylosed, or suppuration may occur.

STATE BOARD EXAMINATION QUESTIONS.

CONNECTICUT STATE MEDICAL EXAMINING BOARD.

ANATOMY.

1. Give (*a*) the number of bones in the human body: (*b*) classify them by regions of body; (*c*) classify by variety and give examples of each. Give briefly the macroscopical and the microscopical structure of bone.

2. Describe the bony relationship and landmarks of the elbow joint.

3. Describe (*a*) the anatomical relations and the structure of the mammary gland; (*b*) its nerve supply, and (*c*) its lymphatic drainage.

4. Of what does the sympathetic nervous system consist? What does the cerebrospinal system comprise?

5. State the origin and mention three branches of the

ophthalmic nerve. To which system does this nerve belong, and what is its function?

6. Give the surface topography of (*a*) the appendix vermiformis; (*b*) the apex of the heart; (*c*) the apices of the lungs; (*d*) the two kidneys posteriorly.

7. What vessels unite to form (*a*) the basilar artery? (*b*) What its course.

8. Define epigastric region and tell what organs or parts of organs are found in the same. Diagram.

9. What is (*a*) the stomach? (*b*) Give its gross anatomy. (*c*) Give the minute anatomy of its mucosa.

10. Write briefly on (*a*) the decidual teeth; (*b*) the permanent teeth.

PHYSIOLOGY.

1. What is the relation of the red and white corpuscles as to (*a*) size, (*b*) numbers, (*c*) function? What causes the variation in the color of the blood?

2. State the source and describe the function of the saliva. Explain the importance of thorough mastication as related to digestion.

3. Describe the muscular movements of the large intestine and explain their function.

4. Give a physiological explanation of the rapid respiration of pneumonitis.

5. Give the localization in the cerebral cortex of the motor function of (*a*) the left side of the face; (*b*) the right arm; (*c*) the left leg. Also illustrate the external cranial topography of the same.

6. Describe the physical and nervous mechanism in normal urine evacuation.

7. How is the cornea nourished?

8. Define secretion and excretion. What organs of the body are purely excretory?

9. What part of the retina is most sensitive to visual impressions? Explain this.

10. Explain the condition causing muscle fatigue.

CHEMISTRY AND HYGIENE.

1. (*a*) How dangerous is impure air? (*b*) How tested? And what would be index of impurity? (*c*) What hygienic measures should be observed in our public schools?

2. Give chemical name and formula for the following: (*a*) blue vitriol; (*b*) common salt; (*c*) plaster of paris; (*d*) paris green; (*e*) sugar of lead; (*f*) corrosive sublimate.

3. (*a*) What are peptones? (*b*) How evolved? (*c*) What are proteoses? (*d*) What are ptomaines?

4. (*a*) What is urea? (*b*) What is the pathological significance of urea in the urine? (*c*) How estimated?

5. (*a*) Given a neutral or faintly acid urine, and on

heating it a precipitate forms. What is this precipitate, and how do you determine it? (*b*) Given an alkaline urine, and on heating no precipitate is seen; is albumen present?

6. (*a*) What are ferments? (*b*) Classify them. (*c*) Name three.

7. Name the chief constituents of the bile.

8. (*a*) Discuss the influence of alcohol on the race. Is it food or poison?

9. Is sanatorium treatment of tuberculosis worth while?

10. What are the symptoms of (*a*) acute poisoning of phosphorus? (*b*) Treatment and antidote. (*c*) Test.

MATERIA MEDICA AND THERAPEUTICS.

1. What is the physiological action and therapeutics of phenacetin?

2. What are the secondary effects of alcohol upon (*a*) stomach; (*b*) liver; (*c*) vasomotor system; (*d*) nervous system?

3. What are emetics? In what way do they act? When indicated? When contraindicated?

4. What changes take place in the blood when illuminating gas is inhaled? Give treatment.

5. What is the action and dose of pilocarpine? Of apomorphine?

6. What is the physiological action and what are the uses of potassium acetate?

7. Name three heart depressants and tell how they act.

8. How and upon what portion of the alimentary tract do the following drugs act: cascara, phosphate of soda, aloes, jalap and calomel?

9. Write a prescription in Latin, unabbreviated, for acute bronchitis, containing four ingredients, and give the action of each.

10. Treat a case of infantile convulsions.

PRACTICE, PATHOLOGY AND DIAGNOSIS.

1. Describe the varieties of stomatitis: (*a*) simple, (*b*) aphthous, (*c*) mycotic, (*d*) ulcerative. Give the causes and treatment.

2. Give the etiology of congestion of the liver, active and passive.

3. Differentiate cardiac asthma from bronchial or spasmodic asthma—symptomatically and pathologically.

4. What are the causes of albuminuria, renal and extrarenal?

5. Describe a case of acute inflammatory rheumatism; state its complications and sequels.

6. What are the varieties of influenza? Give the prominent symptoms of each variety.

7. Diagnosis of scarlet fever, smallpox, measles, and

chickenpox; (*a*) period of incubation; (*b*) eruption; (*c*) course of each disease.

8. Differentiate between cerebrospinal fever and tubercular meningitis, pathologically.

9. Give the symptoms and treatment of chorea.

10. When is the eye ametropic, and what are the forms of ametropia?

OBSTETRICS AND GYNECOLOGY.

1. (*a*) Describe the relation between ovulation and menstruation; (*b*) what is the present belief as regards migration of the ovum?

2. (*a*) State the cause of the premature detachment of the placenta; (*b*) what are the dangers? (*c*) Treatment.

3. (*a*) Give all the causes of prolonged first stage labor; (*b*) the dangers; (*c*) management.

4. (*a*) What are the indications for the use of forceps? (*b*) What condition necessitates version rather than forceps? (*c*) What cesarean section rather than version?

5. (*a*) What are the changes that occur in the uterus during pregnancy? (*b*) After delivery?

6. Differentiate an ovarian cyst from (*a*) ascites; (*b*) hydramnios; (*c*) fibroid tumor; (*d*) distended bladder; (*e*) hematometra.

7. (*a*) What is sapremia? (*b*) How does it differ from septicemia? (*c*) Should treatment differ?

8. (*a*) What pathological conditions require curettage? (*b*) Give the operative technique.

9. (*a*) Give three causes for post-partum hemorrhage. (*b*) Your treatment for each.

10. What are the operative procedures in the treatment of prolapsus uteri? Give indications for each.

SURGERY.

1. Aneurysm: (*a*) causation; (*b*) varieties; (*c*) diagnosis.

2. Carbuncle: (*a*) defined; (*b*) predisposing causes; (*c*) diagnosis; (*d*) treatment.

3. Local anesthesia. Technique of its application in hernia, removal of appendix, or thyroidectomy?

4. Practical demonstration of the use of Janeway's manometer.

5. State your views as to the scope and value of blood pressure determinations in operative surgery under general anesthesia.

6. Describe or depict the arrangement of the synovial sheaths of the palm and fingers.

7. Give the differential diagnosis between a fracture and dislocation at the hip.

8. Diagnosis and treatment of fractured clavicle.

9. What do you consider the best operation for internal hemorrhoids? Describe your technique.

10. Carcinoma: (*a*) varieties; (*b*) location in order of frequency; (*c*) metastasis; (*d*) differentiation?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

CONNECTICUT STATE MEDICAL EXAMINING BOARD.

ANATOMY.

1. (*a*) There are 206 named bones in the human body.

(*b*) *By regions:* The spine, with sacrum and coccyx; cranium, and face, with ossicles of the ear; hyoid, sternum, and ribs; upper extremities; and lower extremities.

(*c*) *By variety:* Long bones, as femur and humerus; short bones, as carpal and tarsal; flat bones, as parietal and scapula; irregular bones, as vertebræ and sphenoid.

Structure, etc., of bone: "Bone is a connective tissue whose ground substance has become impregnated with salts, chiefly phosphate of lime. Two varieties are recognized—compact and cancellous, or spongy bone. The outside layer of all bone is compact, and the inner part is cancellous; but the proportions of the two vary considerably. In the shafts of the long bones only the lining of the hollow center is spongy. In the interstices of spongy bone, and in the medullary cavities of the long bones, there is the bone-marrow.

Periosteum: A tough membrane covers bone except at joints. This is a fibrous tissue structure with numerous blood-vessels in its outer part, and many elastic fibers next to the bone. Fibers from this membrane run for some distance in a more or less radial direction into the bone, and are known as *perforating fibers of Sharpey.*

Compact bone: The fibers are arranged in layers or *lamellæ.* These lamellæ are arranged in four different ways:

(1) The surface layers are arranged round the bone parallel to the periostum (periosteal, circumferential lamellæ). These layers are pierced by minute canals for the admission of blood-vessels.

(2) There are layers in the interior of the bone arranged round the central cavity (medullary lamellæ).

(3) There are layers arranged around vessels. The central canal is known as a Haversian canal. The layers arranged around them constitute the Haversian systems. The fibers of the Haversian systems may either be concentric or may be parallel to the long axis of the canal. The canals run for the most part in the long axis of the

bone, but they are connected by anastomosing branches. The canals contain capillary blood-vessels, lymphatic vessels, and nerve filaments.

(4) Fibers which do not correspond with any of the foregoing are known as interstitial lamellæ. These are, for the most part, the remains of old Haversian systems which have been partially removed in the process of development.

Between the lamellæ are little spaces known as lacunæ, which show fine branching diverticula, the canaliculi. In each space there lies a bone cell (bone corpuscle), and from it fine processes pass out into the canaliculi.

Cancellous bone: The surface layers are arranged parallel to the periosteum, but in the interior the bony strands form a network and show no definite arrangement of lamellæ. The vessels are found in the bone-marrow in the large spaces (Haversian spaces). Cells are found in lacunæ between the fibers, as in compact bone."—(*Aids to Histology.*)

2. There are three bony points: The external condyle of the humerus, the internal condyle of the humerus, and the olecranon process of the ulna. When the forearm is extended these three points are in a straight line; when the forearm is flexed, the olecranon is a little below the line joining the two condyles. The head of the radius can be felt from behind, nearly one inch below the external condyle. The internal condyle is more prominent than the external condyle; the olecranon is nearer to the inner than to the outer condyle.

3. *Mammary gland:* A hemispherical eminence consisting of glandular, fatty, and areolar tissue, lying between the two layers of the superficial pectoral fascia, the lower layer resting upon the sheaths of the pectoralis major and serratus magnus muscles, and the upper layer being covered by the skin. The superficial pectoral fascia (continuous above with the superficial cervical fascia) divides, opposite the upper border of the mamma, into anterior and posterior layers, passing, respectively, in front and behind the gland, and holding it, as it were, in a sling. From the anterior layer of this superficial pectoral fascia numerous processes pass into the gland and support its parenchyma. The posterior layer of this fascia is separated from the deep thoracic fascia by a loose, easily separable layer of areolar tissue. *Nerves:* Anterior and lateral cutaneous branches of the second, third, fourth, and fifth intercostals; and supraclavicular branches of brachial plexus. *Lymphatics* empty into the axillary and anterior mediastinal glands.—(From Bickham's *Operative Surgery.*)

4. "*The sympathetic nervous system consists of* (1) a series of ganglia connected together by a great ganglionic cord, the gangliated cord, extending from the base of the

skull to the coccyx, one gangliated cord on each side of the middle line of the body, partly in front and partly on each side of the vertebral column; (2) of three great gangliated plexuses or aggregations of nerves and ganglia, situated in front of the spine in the thoracic, abdominal, and pelvic cavities respectively; (3) of smaller or terminal ganglia, situated in relation with the abdominal viscera; and (4) of numerous fibers."

The cerebrospinal system comprises the central nervous axis (brain and spinal cord) and the peripheral nerves (cranial and spinal).

5. The ophthalmic nerve is a branch of the trigeminal (fifth cranial) nerve. Its three branches are the Lacrymal, Frontal, and Nasal. It is a sensory nerve belonging to the cerebrospinal system. Its function is to supply sensation to the anterior half of the scalp, conjunctiva and skin of upper eyelid, cornea, skin of nose, mucous membrane of nose, and lacrymal gland.

6. *Appendix vermiformis:* The base is at a point two inches from the anterior superior spine of the ilium, on a line drawn from this spine to the umbilicus.

Apex of the heart: At a point about an inch and a half below and three-quarters of an inch internal to the left nipple.

Apices of the lungs: About an inch above the clavicle, behind the space between the two heads of the sterno-mastoid muscle.

Kidneys: "The upper end of the left kidney would be defined by a line drawn horizontally outward from the spinous process of the eleventh dorsal vertebra and its lower end by a point two inches above the iliac crest. The right kidney would be half to three-quarters of an inch below. Morris lays down the following rules for indicating the position of the kidney on the posterior surface of the body: (1) A line parallel with, and one inch from, the spine, between the lower edge of the tip of the spinous process of the eleventh dorsal vertebra and the lower edge of the spinous process of the third lumbar vertebra. (2) A line from the top of this first line outward at right angles to it for two and three-quarters inches. (3) A line from the lower end of the first transversely outward for two and three-quarters inches. (4) A line parallel to the first and connecting the outer extremities of the second and third lines just described."—(Gray's *Anatomy.*)

7. (*a*) The two vertebral arteries. (*b*) It is situated in the center of a groove on the under surface or front of the pons, extending from the posterior to the anterior border. It lies between the sixth pair of cranial nerves.

8. The *epigastric region* is the middle region of the

upper zone (of the nine regions into which the abdomen is arbitrarily divided). Its contents depend on the location of the lines (which differ in nearly every textbook). When the superior horizontal line is drawn between the cartilaginous ends of the tenth ribs and the inferior line between the anterior superior spines of the ilium, and the vertical lines upward from the iliopectineal eminences, at right angles to the upper horizontal line, then the epigastric region contains the liver, stomach, gall-bladder, duodenum, and pancreas.

9. The *stomach* is that pouch-like portion of the alimentary canal which is situated between the esophagus and the small intestine. It is conical, with base to left side; the upper border is concave, and is called the *lesser* curvature; the lower border is convex, and is named the *greater* curvature. The left extremity is known as the *fundus*, above and to the right of which is the *cardiac* orifice, and the right or small end is termed the *pyloric* extremity. It occupies left hypochrondriac and epigastric regions. Its *orifices are cardiac*, above, communicating with the esophagus; *pyloric*, at the right extremity, passing into the duodenum. It is 10 to 12 inches long, 4 to 5 inches in diameter at widest part. Its *left* or *cardiac end* is fixed by esophagus and gastrophrenic ligament to diaphragm, lying beneath the seventh left costal cartilage, one inch from sternum; it is connected with the spleen by the gastrosplenic omentum. The *right* or *pyloric end* reaches the gall-bladder, touching under part of quadrate lobe of liver; is very movable; when stomach is empty is in midline four inches below tip of gladiolus. *Anterior surface*, which also looks upward, is in contact with, from left to right, diaphragm, abdominal parietes (epigastric region), under surface of liver. *Posterior surface* is separated from pancreas, crura of diaphragm, aorta, vena cava inferior, and solar plexus, by lesser sac of peritoneum. *Superior border* is attached to liver by small omentum. *Inferior border* gives attachment to great omentum. *Coronary* and *pyloric* arteries run along lesser curvature; *right* and *left gastroepiploic*, along inferior or greater curvature; *vasa brevia*, from the splenic to fundus. *Right pneumogastric* nerve supplies the posterior surface; *left pneumogastric*, the anterior surface; *sympathetic*, from the solar plexus, both surfaces.—(*Aids to Anatomy.*)

The *mucosa* "is a pale, pinkish-ash color, thickened toward the pylorus, where it presents numerous rugæ, or pleats, and at the pyloric end it helps to form the pyloric valve. It is lined throughout with columnar epithelium, and is studded with three kinds of minute tubes, the gastric follicles, and lenticular glands. The gastric follicles consist of two kinds, the pyloric and the peptic glands, the

former most abundant at the pyloric end and the latter distributed all over the surface of the stomach. The *pyloric* or *mucous glands* consist each of from two to four blind tubes opening into a common duct, and lined throughout by columnar epithelium. The *peptic glands* are similar in structure, but have a much shorter duct, and contain in addition peculiar large, spheroidal, granular *peptic cells*. The *lenticular* or *simple solitary glands* are small masses of lymphoid tissue scattered throughout the connective tissue framework of the stomach between the gastric follicles."—(Young's *Anatomy*.)

10. The *decidual* teeth are twenty in number, ten in each jaw, or five in each side of each jaw: Two incisors, one canine, and two molars. The *permanent* teeth are similarly, thirty-two in number, sixteen in each jaw, or eight each side of each jaw: Two incisors, one canine, two bicuspids, and three molars. Every tooth has a crown or body, a neck, and a root or fang.

PHYSIOLOGY.

1. (*a*) Red corpuscles are about 1/3200 of an inch in diameter; white corpuscles are about 1/2500 of an inch in diameter.

(*b*) There are about 4,500,000 to 5,000,000 red corpuscles in each cubic millimeter of blood, and about 7,000 to 10,000 or 12,000 white corpuscles in each cubic millimeter of blood.

(*c*) The function of the red corpuscles is to carry oxygen from the lungs to the tissues. Function of the white corpuscles: (1) To serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma. The variation in the color of the blood is due to the presence of oxygen in combination with hemoglobin, giving to arterial blood its red color, and the presence of carbon dioxide (with lessened oxygen), giving to venous blood its bluish color.

2. *Source of saliva:* The parotid, submaxillary, and sublingual glands (and the small mucous and serous glands of the mouth).

The functions of the saliva are: (1) To moisten the mouth, (2) to assist in the solution of the soluble portions of the food, and thus (3) to administer to the sense of taste; (4) to lubricate the bolus of food, and thus (5) to facilitate the acts of mastication and deglutition, and (6) to change starches into dextrin and sugar. Thorough mastication prepares the solid and fibrous foods for the more ready and speedy action of the various digestive juices; it

enables these foods to present also a larger surface to the action of these juices. Food that is imperfectly masticated may cause suffocation; it is also a well-known cause of indigestion.

3. The muscular movements of the large intestine are chiefly of the peristaltic or vermicular kind. This is a wave-like motion, characterized by a contraction of the circular fibers behind a bolus and a relaxation of the fibers in advance of it. The result is a movement forward of the bolus, and as it moves it is followed by a ring of constriction and preceded by a ring of relaxation or inhibition. Under the influence of this peristaltic movement the contents of the large intestine (food residues and excrementitious matter) are gradually carried downward toward the sigmoid flexure, where they accumulate prior to their extrusion from the body. The effects of the peristaltic waves are to some extent interfered with by antiperistaltic waves, which, beginning in the transverse colon, run toward and to the cecum. The intestinal contents are thereby driven back toward the cecum. The effect is a still further admixture with the secretions and exposure to the absorbing mucosa. There is some evidence also that the antiperistaltic wave may force some of the liquefied contents through the ileocolic opening into the small intestine because of the relaxation of the sphincter muscle. (From Brubaker's *Physiology.*)

4. The rapid respiration in pneumonia is due to: (1) Toxemia, which affects the respiratory center; (2) the amount of lung involved; (3) the limited air space left for use; (4) pain.

5. The *motor areas* are located and arranged on the cerebral cortex, immediately in front of the fissure of Rolando. At the upper part of the convolutions in front of this fissure are areas connected with the movements of the lower extremities; then from above downward are located the centers for movements of the shoulders, arms, wrists, fingers, face, lips, tongue, and larynx and pharynx.

To *locate the fissure of Rolando on the scalp:* Draw a straight line over the top of the scalp from the inion to the glabella; bisect this line, and half an inch posterior to the midpoint draw a line downward and forward at an angle of 67.5° for a distance of three and one-half inches. This line will represent the location of the *fissure of Rolando.*

The center for the left side of the face will be in the left cerebral hemisphere; for the right arm, will be in the left cerebral hemisphere; for the left leg, will be in the right cerebral hemisphere.

6. "The urine trickles drop by drop down the ureters, into the bladder, where it collects and gradually distends

it. The exit from the bladder is opposed by the sphincter vesicæ, or, as some believe, by the elastic and muscular fibers of the urethra. The urine is expelled by the contraction of the walls of the bladder, more especially by the detrusor vesicæ, and is assisted when much distended by the contraction of the abdominal walls. Micturition is a reflex act, but one which (with the exception of infants) is under the influence, if not under the control of the will. The mechanism appears to consist of an automatic center in the lumbar part of the cord, maintaining the constant contraction of the sphincter, a second center, which, when stimulated, excites contraction in the detrusor. These centers are antagonistic, so that an afferent impulse from the bladder excites the detrusor center, at the same time inhibiting the sphincter center. These centers are normally under the control of the will, so that, although an afferent impulse may ascend from the bladder to the centers of the cord and up to the sensorium, yet by an effort of will the sphincter center may be assisted and the detrusor inhibited, or *vice versa*. Thus when the bladder becomes distended an afferent impulse from the bladder reaches both lumbar center and the brain; if the opportunity is favorable for micturition the controlling influence of the will is removed, the reflex contraction of the detrusor taking place, assisted perhaps by the voluntary abdominal muscles." (Ashby's *Physiology.*)

7. The cornea is nourished chiefly by the lymph in the corneal spaces or lacunæ and canaliculi. At its border, for a very short distance, there are also capillary loops from the sclera and conjunctiva.

8. *Secretion* is the process by which certain organs (glands and membranes) separate from the blood certain constituents which are further elaborated and serve some further office in the economy.

Excretion is a similar process by which there are removed from the blood waste materials, and products of no further use to the body, and which, if retained, would be injurious.

The purely excretory organs are: Kidneys and skin.

9. The fovea centralis in the macula lutea is the part of the retina most sensitive to visual impressions. Here the end organs of the optic nerve are most highly developed; the cones are here increased both in number and in size.

10. *Causes of fatigue in muscle:* Presence of sarcolactic acid and acid potassium phosphate in the muscle; using up of the material from which the energy is obtained; and accumulation of carbon dioxide and other waste products.

CHEMISTRY AND HYGIENE.

1. (*a*) The danger of impure air depends upon: (1)

The amount of oxygen present; (2) the amount and nature of impurities present (the chief being carbon dioxide, organic matters, crowd poison, disease germs, combustion products, emanations from sewers or marshes, contaminations from trade and manufacturing processes, and decomposition products).

(*b*) *Pettenkofer's method of determining the percentage of carbon dioxide in the air:* A large cylindrical container of known capacity, say, 15 liters, is filled with the air to be examined; a known volume of barium hydroxide is then added and shaken up with the air. The carbon dioxide combines with the barium hydroxide to form a barium carbonate, which is insoluble, and also incapable of acting upon an indicator. The barium hydroxide employed is of known strength, *e.g.* it may be of such strength that 1 c.c. of the solution neutralizes 1 c.c. of carbon dioxide at normal temperature and pressure. If then we find that 10 c.c. of the barium hydroxide has been neutralized by the carbon dioxide present in the air, we know that 10 c.c. of carbon dioxide is present in 15 liters or 15,000 c.c. of the air examined.

2.

	CHEMICAL NAME.	FORMULA
(a) Blue vitriol.	Cupric sulphate.	$CuSO_4$.
(b) Common salt	Sodium chloride.	NaCl.
(c) Plaster of Paris.	Calcium sulphate.	$CaSO_4$.
(d) Paris green.	Cupric aceto-meta arsenite.	$Cu(C_2H_3O_2)_2 + 3 CuAs_2O_4$.
(e) Sugar of lead.	Lead acetate.	$Pb(C_2H_3O_2)_2$.
(f) Corrosive sublimate.	Mercuric chloride.	$HgCl_2$.

3. (*a*) *Peptones* are the final products of the action of proteolytic ferments on proteids.

(*b*) By the action of proteolytic ferment (pepsin and trypsin) on proteids.

(*c*) *Proteoses* are the intermediate products in the conversion of proteids into peptones.

(*d*) *Ptomaines* are basic, nitrogenous compounds, produced from protein material by the bacteria which cause putrefaction.

4. (*a*) *Urea* is the end product of the proteid metabolism of the body. It is a crystalline solid, soluble in water, colorless, odorless, with a slightly bitter taste; it is neutral in reaction, but basic in character; dilute aqueous solutions are not decomposed by boiling, but by prolonged

boiling urea is hydrolized to ammonia and carbon dioxide; urea forms compounds with acids and also with certain salts and oxides. Formula is CON_2H_4.

(*b*) Urea is always present in the urine, a healthy man excreting about 500 grains of urea daily. Pathologically, the amount of urea excreted may be diminished or increased, as follows:

A ***diminution*** may be due to some condition interfering with the normal transformation of proteins in the body, as in certain chronic diseases. More frequently, however, a diminished proportion of urea in the urine is not due to a diminution in the production, but to the fact that the urea formed has not been separated by the kidneys as in uremia, and in diseases attended with dropsical effusions. Pathologically it is *increased* in the early stages of all acute febrile diseases, except when these are attended by the formation of dropsical deposits or by diarrhea; during reabsorption of dropsical fluids; in both forms of diabetes, and in chronic interstitial nephritis.

(*c*) "The specific gravity of the urine is carefully determined, as well as that of the liquor sodæ chlorinatæ. One volume of the urine is then mixed with exactly seven volumes of the liquor sodæ chlorinatæ, and, after the first violence of the reaction has subsided, the mixture is shaken from time to time during an hour, when the decomposition is complete; the specific gravity of the mixture is then determined. As the reaction begins instantaneously when the urine and reagent are mixed, the specific gravity of the mixture must be calculated by adding together once the specific gravity of the urine and seven times the specific gravity of the liquor sodæ chlorinatæ, and dividing the sum by eight. From the quotient so obtained the specific gravity of the mixture after decomposition is subtracted; every degree of loss in specific gravity indicates 0.7791 gram of urea in 100 c.c. of urine. The specific gravity determinations must all be made at the same temperature, and that of the mixture only when the evolution of gas has ceased entirely." (Witthaus' *Manual of Chemistry.*)

5. (*a*) Albumin or phosphates. Add HNO_3; this will dissolve the phosphates, but not the albumin.

(*b*) Albumin may or may not be present.

6. *Ferments* are certain microorganisms (bacteria, mould and yeast fungi) which, by their growth, cause definite chemical changes in certain substances contained in the media in which they develop. They are *classified* as: (1) Proteolytic, *e.g.* trypsin; (2) amylolytic, *e.g.* ptyalin; (3) steatolytic, *e.g.* steapsin; (4) inverting, *e.g.* invertin; (5) coagulating, *e.g.* milk curdling ferment.

7. Water, sodium glycocholate, sodium taurocholate,

bilirubin, biliverdin, fats, soaps, cholesterin, lecithin, urea, sodium chloride.

8. The influence of alcohol on the race cannot be discussed in the space at our disposal. Most of what is written on the subject has absolutely no scientific value, being characterized by prejudices and diatribes rather than by logic and science. Probably most races would benefit if some of the individuals of these races consumed less alcohol. That alcohol is abused or misused is true; so are money and many other things, and the abuse of a thing is no argument against its legitimate use. As to whether alcohol is a food or a poison, there is also much difference of opinion. Taken in excess, it may be a poison; but many scientists believe that it has also a food value. Much depends on the conditions under which it is used and the quantity in which it is taken. The student (and examiner) will easily find any quantity of "literature" which will favor his own particular views or prejudices in the matter, but very little of it is of scientific value.

9. If properly carried out, and in carefully selected cases, sanatorium treatment is worth while.

10. (*a*) Eructation of gas having the odor of garlic. The mouth, when observed in the dark, is frequently faintly luminous (phosphorescent). After several hours, pain in the throat, a sense of heat in the epigastrium, nausea, and vomiting. The vomited matters are sometimes bloody, and frequently luminous when agitated in the dark. The abdomen is tender, and there are diarrhea and colicky pains. After one or two days these symptoms cease, there remaining only pain in the back and limbs and a feeble pulse. Death sometimes occurs suddenly in from two to four days. Usually about the fourth day the patient becomes jaundiced, suffers from headache, insomnia, and retention of urine, rapidly becomes delirious and comatose, and dies.

(*b*) The unabsorbed portion is to be removed as speedily as possible by an emetic of copper sulphate or apomorphin. No chemical antidote is known. French oil of turpentine (the older the better) should be given as a physiological antidote. The food should be free from oils and fats.

(*c*) The matters supposed to contain phosphorus are rendered fluid by dilution with water and acidulated with sulphuric acid. They are placed in a flask upon a sand bath and the flask connected with a Liebig's condenser, which is placed in absolute darkness. Upon heating the flask any phosphorus present is volatilized, and, condensing in the tube, forms a luminous ring. This reaction is very delicate, and the appearance of the ring is proof positive of the presence of unoxidized phosphorus. (From Witthaus' *Essentials of Chemistry and Toxicology.*)

MATERIA MEDICA AND THERAPEUTICS.

1. PHENACETIN. *Physiological Action:* Lowers body temperature, and is an analgesic; it is also a cardiac depressant. *Therapeutics:* In fevers, as an antipyretic, and to relieve pain; also used in epilepsy.

2. The stomach is overstimulated and congested, the gastric glands are similarly affected, gastric catarrh ensues, digestion is impaired, and morning vomiting may occur. The liver and hepatic cells suffer in a similar way. Degenerative changes may follow. It is a vasodilator, and lowers arterial tension. The nervous system is specially affected, and eventually paralysis or epilepsy may result from the long continued use of alcohol.

3. *Emetics* are agents which produce vomiting. They *act:* (1) By irritating the nerves of the stomach, esophagus, or pharynx; (2) through the circulation; (3) by irritation of the vomiting center in the medulla. *Indications:* To produce vomiting or nausea; in catarrhal conditions of the respiratory tract; to remove poisons or foreign bodies from stomach, esophagus, etc.; to empty the stomach. *Contraindications:* Severe cardiac lesions and aortic aneurysm; atheroma; when the patient is so weak that there is danger of collapse; in poisoning by caustics; in hernia or peritonitis, or in cases of high arterial tension.

4. When illuminating gas is inhaled, the color of the blood is a very bright red, much brighter than normal; the cells are not altered in *appearance,* but the red corpuscles are incapable of carrying oxygen to the tissues, as the carbon monoxide forms with the hemoglobin a compound which is very much more stable than oxyhemoglobin. The spectroscope shows, also, a characteristic absorption spectrum. *Treatment:* Stimulants, fresh air, bleeding, and hypodermocleisis, or infusion of normal salt solution.

5. PILOCARPINE: *Dose,* gr. 1/5. *Action:* Stimulant of secretory nerves and of involuntary muscles, myotic, nervous depressant, sudorific.

APOMORPHINE HYDROCHLORIDE. *Dose:* As an emetic, gr. 1/10 subcutaneously; as an expectorant, gr. 1/30. *Physiological action:* It acts on the vomiting center in the medulla, hence is emetic; it increases pulse, blood pressure, and rate of respiration; it is also an expectorant.

6. POTASSIUM ACETATE. *Physiological action:* Antacid, increases alkalinity of the blood and of the urine, is a diuretic, and a diaphonetic. *Uses:* In rheumatism, gout, fevers, dropsy, nephritis, cystitis, and irritation of the urinary tract.

7. *Three cardiac depressants:* (1) Antimony, which depresses the motor ganglia; (2) pilocarpine, which stimulates the inhibitory ganglia and depresses the heart muscle

and also the motor ganglia; (3) hydrocyanic acid, which is a direct cardiac poison, depressing the heart muscle and the motor ganglia.

8. *Cascara* is a stomachic and laxative, and acts on the stomach and small intestine. *Phosphate of sodium* is a saline, hepatic stimulant, and cholagogue; it acts on liver and colon. *Aloes* is a purgative, hepatic stimulant, and cholagogue, and acts on the large intestine (chiefly descending colon and rectum) and liver. *Jalap* is a drastic purgative, and acts on the small intestine. *Calomel* is a simple purgative, and acts on the small intestine.

9. ℞. Ammonii carbonatis, ʒj.
Spiritus chloroformi, ʒj.
Syrupi pruni virginianæ, ʒj.
Misturæ glycyrrhizæ compositæ, q.s. ad. ʒviij.
Misce.
Signa: One tablespoonful every three hours.

The ammonium carbonate is a respiratory stimulant and a stimulating expectorant. The chloroform disguises the taste of the ammonium. The prunus virginiana is a sedative and expectorant. The glycyrrhiza is an expectorant.

10. *Treatment of infantile convulsions:* "A few drops of chloroform or chloroform and amyl nitrite should be inhaled by the patient. Morphine (gr. 1/48 to a child six months old) may be given hypodermically and repeated in a half hour if necessary. The bowel should be irrigated, and chloral, gr. 5, may be administered in enema and repeated in an hour. The child should be kept in a quiet room and nerve sedatives should be used. If there are symptoms of collapse the hot bath or mustard pack should be employed. The mustard pack is employed as follows: A towel is saturated in warm water to which a tablespoonful of mustard to the quart has been added; the child is wrapped in the towel and then rolled up in a woolen blanket and allowed to remain thus for 10 or 15 minutes, or until the skin becomes red from the effects of the mustard. This may be repeated every 2 or 3 hours if necessary, in the intervals keeping the child's body warm with hot-water bottles. Cold applications should be kept on the head. A careful search should be made for any underlying cause, and appropriate treatment instituted."—(Gould and Pyle's *Pocket Cyclopedia.*)

PRACTICE, PATHOLOGY, AND DIAGNOSIS.

1. *Simple stomatitis:* A simple catarrhal inflammation of a portion or of the entire surface of the mouth. It occurs most commonly during the period of first dentition. It results from uncleanliness, the ingestion of irritating food, infectious fevers, gastrointestinal disturbances,

etc. The mouth is red, dry, and hot; later there is an increased flow of saliva; coated tongue, constipation, slight fever, thirst, etc., are present. The affection lasts about one week, during which sucking is painful. The *treatment* consists in cleansing the nipple and the child's mouth frequently, the administration of fractional doses of calomel, and the use of mild alkaline mouth washes.

Aphthous stomatitis: This form of stomatitis is characterized by a hyperemia of the mucous membrane of the mouth and by the formation upon it of small, yellowish-white vesicles of a herpetic character. Children from six to eighteen months of age are the most commonly affected. It is due to uncleanliness, improper feeding, bad hygiene, etc. The affection is self-limited, but proper feeding, regulation of the bowels, and improved hygiene should be instituted, and mouth washes containing boric acid or sodium salicylate should be used.

Mycotic stomatitis: An affection of the mouth characterized by a catarrhal condition and by the presence on the mucous membrane of white, flake-like patches. It occurs usually in young infants, and is caused by a vegetable parasite (one of the mold fungi) variously known as oidium albicans or saccharomyces albicans. It results from uncleanliness, and the treatment is similar to that of catarrhal stomatitis.

Ulcerative stomatitis: An inflammation and ulceration of the mucous membrane of the mouth, principally of the gums. It results from infantile scorbutus, infectious fevers, mercurial salivation, malnutrition, improper hygiene, etc. The symptoms include slight constitutional disturbances, reddened and swollen gums, pain and salivation, acrid, irritating, and offensive saliva, foul breath, hemorrhages from the mucous membrane on pressure, etc. The treatment should first be directed toward the diet and hygiene of the patient. Salicylate of sodium, borax, or hydrogen dioxide may be used in mouth washes. Potassium chlorate should be administered internally (gr. 10-20 in 24 hours to child one year of age) and also should be used locally.—(Gould and Pyle's *Pocket Cyclopedia.*)

2. *Active* congestion of liver is due to inflammatory abdominal diseases. *Passive* congestion is due to diseases of the heart and lungs which cause obstruction to the circulation; to pleural effusions, and thrombosis of inferior vena cava.

3. Bronchial asthma is an expiratory dyspnea that occurs spasmodically; it is supposed to be due to diminished calber of the smallest bronchial tubes, but the pathology is not settled. Cardiac asthma is not asthma at all, but is probably a myocarditis; it is not *spasmodic.*

4. *Albuminuria* is found: "(1) In fevers, as typhoid and

pneumonia. (2) In valvular heart lesions, degeneration of the heart muscles, diseases of the coronary arteries, impeded pulmonary circulation, in pregnancy by pressure upon the renal veins, in intestinal catarrh, and in Asiatic cholera. (3) In purpura, scurvy, leukemia, pernicious anemia, jaundice, diabetes, and syphilis. (4) After taking lead, mercury, iodine, phosphorus, arsenic, antimony, chloroform, cantharides, oxalic, carbolic, salicylic, or the mineral acids, turpentine and nitrates. (5) In large amounts in acute nephritis and chronic parenchymatous nephritis; in small amounts in chronic interstitial nephritis, and amyloid kidney."—(Witthaus' *Essentials of Chemistry.*)

5. Rheumatism is an acute disease of unknown origin, with high fever, profuse perspiration, inflamed joint and a tendency to attack the heart. The chief complications and sequels are: Hyperpyrexia, cardiac affections, bronchitis, bronchopneumonia, chorea, delirium.

6. VARIETIES OF INFLUENZA: (1) *Respiratory,* like catarrhal fever, but more severe, sneezing, unproductive cough, pain in back, and dyspnea. (2) *Gastrointestinal,* with nausea, vomiting, diarrhea, jaundice, and enlarged spleen. (3) *Nervous,* with headache, convulsions, prostration, insomnia, neuritis, and slow recovery.

7. *Scarlet fever:* Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours. Character of eruption, a scarlet punctate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker; the tongue is of the "strawberry" type, the lymphatics in the neck may be swollen, and there is sore throat; Koplik's spots are absent. *Smallpox:* The eruption usually appears first on the forehead and wrists, and on the third or fourth day; it is first mascular, then papular, then vesicular, and finally pustular; it does not appear in successive crops; the spots are multilocular, and do not collapse on being punctured; the papule is hard and shotty, and does not disappear on stretching the skin. Period of incubation is from eight to fourteen days. *Measles:* Period of incubation, ten to twelve days. Stage of invasion, four days. Character of eruption, small, dark red papules with crescentic borders, beginning on face and rapidly spreading over the entire body; desquamation is branny. The eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower, the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present. *Chickenpox:* The eruption usually appears first on the trunk, is evident on the first day, comes in successive crops, is not shotty, and disappears on stretching

the skin; the spots are unilocular, and collapse on being punctured. The period of incubation is from four to fourteen days.

8. *Cerebrospinal meningitis* generally begins on the frontal lobes, and extends backward and downward, involving the basal membrane, and those of the cord later. It is caused by the diplococcus intracellularis. The pia and arachnoid may have a fibrous covering, and pus may be found on the spinal cord.

Tubercular meningitis begins on the basilar surface of the brain, generally is secondary to tuberculosis elsewhere, there is generally a sero-fibrinous or purulent exudate; miliary tubercles are found about the pons, optic chiasm and sylvian artery.

9. *Chorea* is a subacute, nonfebrile disease, usually affecting children, and characterized by local or general irregular twitching and incoordinate movements of the muscles. They simulate more or less purposive movements. Some are influenced by the will, others are not. Some are absent when the patient is at rest. Fright, injury, mental worry, infectious fevers, and rheumatism are causative factors. Irritability of temper, anemia, poor appetite, and constipation often accompany the affection. Heart-disease and rheumatism sometimes occur as complications. The disease usually lasts from 6 to 8 weeks. *Treatment:* Rest, removal of cause, warm baths, massage, milk, proper diet, chloral and bromides.

10. The eye is *ametropic* when, in a condition of rest, parallel rays of light are focussed either behind or in front of the retina, and not on it. The forms of ametropia are: Hyperopia, myopia, and astigmatism.

OBSTETRICS AND GYNECOLOGY.

1. The connection between ovulation and menstruation is not yet definitely settled, but the two functions seem to be closely associated. It has been held that ovulation is dependent upon menstruation; also that menstruation is dependent upon ovulation; it has also been proved that each may occur without the other, and it is possible that they are both dependent upon some common (and as yet unknown) cause.

Migration of the ovum. "After the ovum is discharged from the ovary it is caught in a current of fluid moistening the surface of the ovary and is carried to the interior of the corresponding tube. The existence of this current of fluid is explained by the movement of the ciliated epithelium in the tubes. Arrived in the tube, the ovum is transported to the uterine cavity by the movement of the cilia on the epithelium and by the vermiform movements of the tubal walls. In certain cases of extra-uterine pregnancy

an anomalous transmigration of the ovum has been demonstrated. Thus it is possible for the ovum, after its discharge from the ovary, to be taken up by the fimbriated extremity of the opposite tube—an external transmigration of the ovum. It is also possible for the ovum to traverse one tube and the uterine cavity and to enter the uterine ostium of the opposite tube—an internal transmigration of the ovum." (Hirst's *Obstetrics.)*

2. PREMATURE DETACHMENT OF PLACENTA. *Causes:* Twin pregnancy, renal disease, placental disease, anemia, pelvic congestion, irregular uterine contractions, traumatism. *Dangers:* Concealed hemorrhage, internal hemorrhage, shock, and death. *Treatment:* Prompt delivery of the child; dilate the os, rupture the membranes, forceps or version; tonics and hypodermocolysis for the mother.

3. PROLONGED FIRST STAGE OF LABOR. *Causes:* Defect in uterine muscle, defect in innervation of uterus, exhausted uterine muscle, twin pregnancy, hydramnios, fevers, hemorrhage, fatigue, premature rupture of membranes. *Dangers:* Asphyxiation of fetus, post-partum hemorrhage, pressure necrosis, sepsis, exhaustion and death. *Treatment:* Rest, strychnine, bromides, chloral, abdominal binder, version, or forceps.

4. (*a*) *Indications for the use of forceps* are: "1. *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. 2. *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. 3. *Passenger at fault:* A.—Dystocia due to (*a*) occipitoposterior, (*b*) mentoanterior face, (*c*) breech arrested in cavity. B.—Evidence of fetal exhaustion (pulse above 160 or below 100 per minute). 4. *Accidental complications:* Hemorrhage; prolapsus funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both." (*b*) *Indications for version* are: (1) In transverse presentations: (2) in placenta prævia; (3) in malpresentations of the head; (4) in simple flattened pelvis, and in minor degrees of pelvic contraction; (5) in prolapsed funis; (6) in sudden death of the mother, and (7) in any case where speedy delivery is imperative. (*c*) *Indications for cesarean section* are: Extreme pelvic contraction or deformity in which delivery by forceps or version or symphyseotomy is impossible, and in which craniotomy is either impossible or would be more dangerous to the mother; the presence of extreme atresia of the vagina; rupture of the uterus; sudden maternal death.

5. CHANGES IN UTERUS. *During pregnancy* the uterus increases in *size* (from 3 to 12 inches in length; from 1½ to

9 inches in breadth), in weight (from about one ounce to two pounds, not including its contents). The cavity is enlarged over 500 times. All the tissues, muscles, ligaments, arteries, veins, lymphatics, and nerves become tremendously hypertrophied. The uterus also changes its position; at first it drops, later it gradually rises, till just before labor (when it again drops). *After labor:* There is a reduction in size and weight of all the component parts; and fatty degeneration of the decidual cells.

6.

ASCITES.	OVARIAN CYST.
1. Previous history of visceral disease.	1. No such history.
2. Enlargement comparatively sudden.	2. Gradual.
3. Face puffy; color waxy; early anemia.	3. Facies ovariana. Anemia absent, or later.
4. Patient on back, enlargement symmetrical; flat in front.	4. Asymmetrical until tumor is quite large; prominent in front.
5. Sitting up, abdomen bulges below.	5. No appreciable change.
6. Navel prominent and thinned.	6. Navel usually unchanged.
7. Fluctuation decidedly clear, diffuse throughout abdomen, but avoids highest parts in all positions, and always has a hydrostatic level.	7. Less clear; limited to cyst; not modified by change of position. No hydrostatic level.
8. Intestines float on top of fluid; hence percussion gives clear tympanitic note over the highest parts of abdominal cavity, and dullness in lowest parts for all positions, *i.e.* areas of resonance and dullness change with position.	8. No change in areas of dullness and resonance with change of position. Dullness over cyst. Clear resonant note in all parts beyond cyst limits, *i.e.* in flanks and toward the diaphragm.
9. Vaginal touch detects fluctuation, bulging into vagina.	9. Vaginal fluctuation less clear or absent.
10. Uterus in prolapsed location, but position unchanged. Size and mobility unchanged.	10. Uterus displaced forward or backward, or laterally by pressure of cyst.
11. Hydragogues and diuretics temporarily remove the fluid.	11. Medicines have no effect.

ASCITES.	OVARIAN CYST.
12. Fluid light straw color and thin. Coagulates spontaneously.	12. Fluid light or dark and of varying consistency; albuminous, but does not coagulate spontaneously; may contain colloid matter.

HYDRAMNIOS.	OVARIAN CYST.
1. Evidence of pregnancy. 2. Rapid development. 3. Ballottement. 4. Distention symmetrical.	1. Not usual. 2. Less rapid. 3. Absent. 4. Distention more on one side.

FIBROID TUMOR.	OVARIAN CYST.
1. Slow growth.	1. Usually more rapid growth.
2. Facial expression unchanged. Face may be full and flushed; later pale from hemorrhage.	2. Facies ovariana.
3. General health usually unimpaired except from loss of blood, if submucous or mural; may be painful.	3. General health early impaired from emaciation. Not painful.
4. Abdomen usually very asymmetrical from irregular shape of tumor.	4. Abdomen more symmetrical, especially when tumor is large.
5. Abdominal veins not usually enlarged.	5. Usually enlarged, especially in large polycysts.
6. Action of kidneys normal.	6. Kidneys less active.
7. Usual menorrhagia.	7. Menstruation unchanged or diminished.
8. Elasticity, not fluctuation. No percussion wave.	8. Fluctuation marked. Percussion wave marked.
9. Surface firm and usually lobulated.	9. Surface yielding; in monocysts, regular; in polycysts, irregular.
10. Vaginal touch and conjoined examination show tumor dense and firm, and, unless pedunculated, continuous with uterus. Uterus large and heavy.	10. Uterus normal, except displacement from pressure. Tumor compressible, fluctuating, detached from uterus.
11. Uterine cavity much elongated.	11. Not materially elongated. (This is a most important diagnostic point.)
12. Uterus moves with tumor.	12. Does not move with tumor.

Distended bladder: The use of a catheter will absolutely settle the diagnosis.

Hematometra: The enlargement is perfectly symmetrical, and external os or cervix will be found completely closed.—(Tables from Dudley's *Gynecology.*)

7. Sapremia is a lighter form of septicemia. In *sapremia* the blood contains the toxins of putrefactive bacteria, but does not contain the bacteria themselves. In *septicemia* the blood contains both the toxins and also the bacteria.

(*a*) *Sapremia* is treated: Removal of the decomposing matter by finger, curette, or douche; drainage and asepticizing the affected area; purgatives and diuretics are given; also diaphoretics and stimulants; saline by hypodermoclysis or infusion; food must be fluid, concentrated, and nourishing; tonics are indicated; symptoms are treated as they arise. (*b*) *Septic endometritis* is treated: Disinfection of the genital canal, as far as possible; sterile water, saline solution, antiseptic fluids, and curette are all useful; tamponade may be advisable; general treatment as in sapremia.

8. CURETTAGE. *Pathological Indications:* To remove pieces of retained placenta or decidua, endometritis, mucous polypi, hemorrhage, dysmenorrhea, endocervicitis. *Dangers:* Sepsis, perforation of uterus, hemorrhage, abortion, inflammation of uterus, or adnexa. *Procedure:* All antiseptic and aseptic precautions are necessary, the patient should be in the dorsal position, the vagina is to be disinfected, and the cervical canal dilated; a speculum is introduced into the vagina and the cervix is drawn down with volsella; the uterine cavity is irrigated with creolin or lysol; a curette is inserted to the fundus and moved down to the internal os; the operator should begin at one cornu and go in the same direction all around till he reaches the starting point, and if necessary repeat till no more spongy or hyperplastic tissue appears; the fundus should be scraped separately by moving the curette along it from side to side; in going towards the fundus no scraping should be done, and care must be taken not to perforate the uterus; should this happen no fluid must be injected; otherwise the uterus and vagina are again irrigated, and one or more strips of iodoform gauze are inserted into the cavity to act either as a hemostatic plug or as a drain, which is diminished with two days' interval and withdrawn on the sixth day. A hemostatic tampon should be placed in the vagina and withdrawn the following day. If any fever arises, the tampon is at once removed and the vagina douched with antiseptic fluid every three hours. If not, the vagina is only swabbed with the same every day, and packed loosely with iodoform gauze. After the final removal of the gauze the antiseptic douche is given twice a day until there is no

more discharge. The patient should remain in bed for a week.

9. *Three causes for post-partum hemorrhage:* Relaxation of uterine muscle, retention of placenta or clots, and lacerations.

In postpartum hemorrhage: Grasp the uterus at once, through the abdominal wall, and massage it firmly. Anything in the uterus should at once be cleaned out. Pass one hand into the uterus, and with the other on the outside make firm pressure. A hypodermic of ergotin, or ergot can be given by an assistant. An intrauterine douche of hot sterilized water (about 115° F.) may be given. Sometimes a very thorough packing and plugging of gauze of uterus and vagina may be necessary. Whatever is done must be done promptly; and everything likely to be needed for this emergency should be prepared beforehand in every labor.

"In the presence of actual hemorrhage the treatment varies according as the placenta is still within the uterus or has already been expelled. In the former case the uterus should at once be grasped through the abdominal wall and firmly kneaded. If firm contractions come on, all is well; but if the hemorrhage continues and the uterus relaxes as soon as the kneading is stopped, the placenta should be expressed by Credé's method; and if this cannot be accomplished and the patient's condition is alarming, manual removal may become necessary. . . . If the hemorrhage does not cease after the delivery of the placenta, the cause should be ascertained and suitable treatment instituted. Tears should be located and their edges brought together by sutures. On the other hand, if the hemorrhage is the result of the retention of placental tissue, the carefully disinfected hand should be carried up into the uterus in order to seek for and remove the retained cotyledon. Under such circumstances the hand acts as a most efficient irritator, causing the uterus to contract energetically. After separating the retained portion of the placenta the hand should not be withdrawn at once, but should be allowed to recede gradually as it is forced down by the contraction of the fundus. If the hemorrhage is due to atony the uterus should be vigorously kneaded, and from forty to sixty minims of ergot or of ergotol administered hypodermically. . . . If these measures are not attended with the desired result, a very hot intrauterine douche of several liters of sterile salt solution should be employed. . . . If the hemorrhage persists in spite of the douche, our only hope of controlling it is by packing the uterus tightly with sterile gauze. Before resorting to the use of the pack it is always advisable to palpate the interior of the uterus, as occasionally a portion of the placenta may have been retained, even though immediately after expulsion the organ

may have apparently been entire." (Williams' *Obstetrics.*)

10. "A prolapsed uterus must first be placed in proper position, or a procidentia reduced. In many cases the introduction of a rubber ring pessary will then suffice to prevent recurrence. But it will often be found necessary to repair a torn perineum, removing at the same time redundant portions of the vaginal walls, before the ring will remain in the vagina. When such an operation is contraindicated, and the vaginal orifice is so wide that a ring cannot be kept in, some form of pessary with a vaginal stem and perineal bands will be required. In cases of procidentia, where the exposed surface is much ulcerated, the patient should be kept in bed, emollient applications made to the ulcers, and vaginal douches given. When the ulcers have healed, a pessary may be introduced. Procidentia due to supravaginal elongation of the cervix must be differently dealt with. Amputation of a portion of the cervix must therefore form the first step in the treatment, and it may be required also when the hyperplasia is secondary to descent. Cases of prolapse and procidentia which resist milder measures require further operative procedures, such as ventrofixation of the uterus or the shortening of the round ligaments. It is in cases of this kind that hysteropexy has often given satisfactory results. Total extirpation of the uterus has been advised and practised for the treatment of procidentia."—(Sutton and Giles' *Diseases of Women.*)

SURGERY.

1. ANEURYSM. *Causes of True Aneurysm.*—Some preceding disease is always present, usually atheroma; and dilatation occurs only after the middle coat has been weakened. Contusions or strains may rupture the middle coat, and so produce weakness, which subsequently allows dilatation to occur. Increase in the blood-pressure by sudden and violent exertions tends to the production of aneurism.

Varieties.—There are three forms: (1) *Sacculated Aneurism* is one in which the dilatation springs from one side of the artery only, and in which the sac communicates with the artery by a comparatively narrow opening. (2) *Fusiform Aneurysm* is due to a general dilatation of the whole circumference of an artery. Its progress is slower than that of the sacculated variety, and there is little or no laminated clot at first. It usually ends in the formation of a sacculation at one part. (3) *Dissecting Aneurysm* is due to blood getting into the middle coat and stripping it up. It cannot be recognized during life.

Diagnosis: Intrinsic Signs.—An expansile tumor, pulsating synchronously with the heart, associated with a bruit and in the course of a vessel, is present. If the artery is

compressed on the cardiac side, pulsation ceases, and the tumor becomes softer and can be diminished in size by pressure. On removal of the compression the tumor regains its size in two or three beats. Pressure on the distal side of the sac makes it more tense.

Extrinsic signs are due to pressure produced by its increase in size, and to interference with the circulation. The pulse on the distal side is diminished and delayed. Pressure on the veins may cause congestion and edema, and even gangrene. Pressure on nerves produces pain, anesthesia, or paralysis. Bones are eroded, and spontaneous fracture may occur. Cartilage is less affected than bone. Tubes, such as the trachea and esophagus, are compressed and ulcerated, so that the aneurysm may burst into them. The heart is hypertrophied because of the increased work thrown upon it. *(Aids to Surgery.)*

2. *Carbuncle* is a localized inflammation of the subcutaneous tissue, which has gone on to sloughing. Staphylococci are the exciting cause; diabetes, albuminuria, infective fevers, and lowered vitality are the predisposing causes.

The disease begins as an infiltration of a patch of subcutaneous tissue, which is hard, painful and tender, and the skin over it red and hot. The infiltration may extend till it is the size of a dinner-plate, and the inflammation ends in sloughing and suppuration, not only of the subcutaneous tissues, but of small areas of the skin over it, so that openings develop in the skin, and allow of the exit of pus and sloughs. The openings extend, the sloughs separate, and the wound heals by granulation. The back is a common situation. Sometimes the face is affected, and there is then a danger of thrombosis extending to the cavernous sinus and producing pyemia.

Treatment: Anesthetize, scrape away the slough, treat the surface with pure phenol, dress with antiseptic gauze, and give the patient good food and tonics.

3. "The line of the incision should first be infiltrated, and then a deep infiltration made around the thyroid with the long blunt needle, especial attention being paid to injections behind the sterno-mastoid into the region of the cervical plexus. The thyroid itself is insensitive, but any pulling on the surrounding structures is associated with a pain which the patient describes as "pressing," and a second injection into the deeper parts of the wound is sometimes necessary." (Choyce's *Surgery.)*

4. "The portable instrument of Janeway is accurate and practical because of its broad arm piece, which excludes the errors (high readings) inherent in the narrow compression bands when applied to unusually fat or muscular arms, and because of its accurate regulation of pressure by a stopcock. *Technique:* The hollow armlet applied midway be-

tween shoulder and elbow is inflated by the hand bulb until the radial pulse is lost, then by the outlet thumb-screw the pressure is lowered until the pulse return is just perceptible. As the pressure is equal in all parts of the closed system, the height of the mercury column in the manometer tube is an exact index, and the reading represents the 'maximum' or 'systolic' pressure. 'Diastolic' or 'minimum' pressure is determined by noting for ten or twelve pulsations the increasing amplitude of the pulse wave registered by the mercury column as the pressure is reduced in 5-mm. series. The point causing maximum excursion is the index of diastolic pressure. Below that is a limited pressure area of equal amplitudes. The 'mean' pressure represents the average of systolic and diastolic readings. Diastolic readings run about 25 to 40 below systolic, and in low tension vary 50 to 80, and in regurgitation up to 100 mm. A loose band or a rapid or excessively small pulse makes diastolic pressure determination impossible, and in every case the arm band should be closely adjusted, the arm supported at the heart level and the same position taken for a series of tests. The limit of error in calcareous arteries is but 5 to 10 mm., and is negligible or easily estimated. The same figures represent the difference between females and <males and the standing> and sitting posture. In normal pressure four factors are concerned, viz., the initial heart energy, peripheral resistance, blood volume, and the elasticity of the vessels. The normal readings, according to Janeway, are: For young adults, 100 to 130; older adults, 100 to 145; children, 90 to 110; infants under two years, 75 to 90. Excitement may cause a rise of 40 mm., and concentrated physical effort a slight increase."—(Greene's *Diagnosis.*)

5. The blood pressure is an indication of the degree of shock; in severe operations it is generally lowered below 100 mm.; and below 80 mm. is supposed to be indicative of danger. It is not in general use but is (theoretically) of value.

6. The second, third, and fourth fingers each have separate sheaths, which extend from the neck of the metacarpal bones to the base of the terminal phalanges. The thumb and little finger have each a sheath which extends upward into the forearm.

7. In fracture of the neck of the femur, the head of the femur will be found in the acetabulum; in dislocation, the acetabulum will be empty, and the head of the femur will be found elsewhere, *e.g.* on the dorsum of the ilium. In the fracture, crepitus may be elicited; in the dislocation, never. In the dislocation there is inversion and a fixed position of the limb, both of which are absent in fracture.

8. *Fractured clavicle.* Shoulder is depressed and drawn forward and inward.

Sayre's method for fractured clavicle: Sayre's dressing consists of two strips of adhesive plaster three and a half inches wide and two yards in length. The first strip is looped around the arm just below the axillary margin and is pinned or sewed with the loop sufficiently open not to constrict the arm. The arm is then drawn downward and backward until the clavicular portion of the pectoralis major muscle is put sufficiently upon the stretch to overcome the action of the sternocleidomastoid muscle, and in this way draws the sternal fragment of the clavicle down to its place. The strip of plaster is then carried completely around the body and pinned or stitched to itself on the back. The second strip is next applied, commencing on the front of the shoulder of the sound side; thence it is carried over the top of the shoulder diagonally across the back, under the elbow, diagonally across the front of the chest to the point of starting, where it is secured by pinning or sewing. A slit is made in this strip to receive the point of the elbow. Before the elbow is secured by the plaster it should be pressed well forward and inward." (Wharton's *Minor Surgery and Bandaging.)*

9. *Clamp and cautery.* The bowels are emptied, and the patient is placed in the lithotomy position. The sphincter is then dilated with two thumbs, to expose the piles, which are caught up with ring forceps. A clamp is applied to the piles in turn, and they are removed by the cautery. The bowels are kept confined for five or six days, when castor-oil is given.

10. (*a*) *Varieties of carcinoma:* (1) Glandular or spheroid carcinoma. (2) Squamous carcinoma. Synonyms, epithelioma; squamous epithelioma. (3) Rodent cancer or rodent ulcer. (4) Columnar carcinoma. Synonyms, columnar epithelioma; adenoid cancer. (5) Thyroid carcinoma (resembling in structure the thyroid gland).—(From Gould and Pyle's *Cyclopedia.* (*b*) *Location: Scirrhous* in breast, stomach, skin, and rectum; *encephaloid,* in testicle and ovary; *colloid,* in stomach, intestine, ovary, breast and thyroid. (*c*) By the lymphatics.

STATE BOARD EXAMINATION QUESTIONS.

Board of Medical Examiners of Georgia.

ANATOMY.

1. Beneath what points on the anterior chest walls are the apex and base of the heart, and the cardiac valves?

2. What blood vessels pass to and from the liver? What

arteries unite to form the basilar artery?

3. Name principal lobes of brain and fissures dividing them. What are the Meibomian glands?

4. Name twelve pairs cranial nerves. What cranial nerve has the widest distribution? Give its four principal points of distribution.

5. Name the five muscles of the shoulder. Describe briefly the quadriceps extensor femoris.

6. With what bones does the clavicle articulate? Name divisions of vertebral column, and mention marked characteristics of cervical and dorsal vertebræ.

7. Give boundaries of anterior mediastinum. Name subdivision of alimentary canal.

8. Locate and describe briefly the ilio-cecal valve. Name lobes and fissures of liver.

9. Locate the kidneys. Name arteries and veins passing to and from kidneys.

10. Describe briefly the uterus. Give divisions of the male urethra. What portion of the bladder is uncovered by peritoneum?

PHYSIOLOGY.

1. What is human physiology?

2. Mention the digestive organs.

3. (*a*) What is the difference in chyme and chyle? (*b*) What are the functions of bile, and how much is poured into the intestines in 24 hours?

4. How and where do the various types of foods, when digested, enter the body?

5. (*a*) What is systole? (*b*) diastole? (*c*) Explain how the two distinct heart sounds are produced.

6. Name the ductless glands and give the theory as to their functions.

7. What is the function of (*a*) the Eustachian tube? (*b*) the semicircular canals?

8. Describe and give the origin of the (*a*) white blood-corpuscles; (*b*) red blood-corpuscles.

9. Describe the structure of (*a*) striated muscle; (*b*) nonstriated muscle; (*c*) which is involuntary, and why?

10. (*a*) Give the physiological explanation of rapid breathing in pneumonia; (*b*) explain why pneumonia patients should be given plenty of fresh air; (*c*) what is the vital capacity of the lungs?

CHEMISTRY.

1. (*a*) What is chemistry? (*b*) What is organic chemistry? (*c*) What is inorganic chemistry?

2. What is (*a*) a molecule? (*b*) an atom? (*c*) an element? (*d*) What is synthesis? (*e*) What is valence?

3. How is (*a*) nitric acid and (*b*) hydrochloric acid

made? Express the reactions in the process by giving the formulas and chemical equations.

4. What is (*a*) an acid? (*b*) a base? (*c*) salt? Give chemical formulas illustrating each.

5. Give chemical formulas for table salt, cooking soda, Epsom salts, calomel, corrosive sublimate, acetic acid, iodoform, blue vitriol, sal ammoniac, plaster of Paris. (Answer any five of these.)

6. Give chemical antidote for each of the following: carbolic acid, nitric acid, zinc salts, lead salts, iodine, caustic alkali, tartar emetic, strychnine, phosphorus, sulphuric acid. (Answer any five of these.)

7. What is a chemical antidote for arsenic? and give test for arsenic.

8. What is an alkaloid? Name one of belladonna, cinchona, pilocarpus, nux vomica, hyoscyamus, erythroxylon coca, and four of opium.

9. Name and describe test for (*a*) albumin in urine. (*b*) Sugar in urine. (*c*) Give test for indican. (*d*) In what pathological conditions is an increased elimination observed in the urine?

10. Mention a good substance used for disinfection after the prevalence of contagious diseases, and explain the chemical action in the process.

MATERIA MEDICA AND THERAPEUTICS.

1. (*a*) Name the official digestive ferments; (*b*) compare their therapeutic uses; (*c*) and tell how each is made.

2. (*a*) Give the modes of applying the hot pack; (*b*) and state the indications for its use.

3. What are the physiological effects and medicinal uses of the preparations of belladonna?

4. (*a*) Give the physiological action of ergot; (*b*) and mention its therapeutic uses.

5. Mention the medicinal uses of turpentine.

PATHOLOGY.

1. State conditions which will cause enlargement of the lymphatic glands.

2. Give pathology of erysipelas.

3. Macroscopically, state differences in throat lesion of diphtheria from that of follicular tonsillitis.

4. Pathology of acute poliomyelitis.

5. Describe pathologic appearance of acute parenchymatous nephritis.

6. Name the diseases in which intestinal ulceration is an essential feature. Name the portion (or portions) of the intestinal tract in which the ulceration is found in each of these diseases.

7. Give a diagrammatic representation of a boil.

8. State difference between congestion and inflammation. Give example of each.

9. In a case of supposed abscess of appendix, what would a blood picture be worth, and how would a differential count bear to a total leucocyte count as to the prognosis of the case?

10. Name the pyogenic organisms, and differentiate each.

PRACTICE OF MEDICINE.

1. Differentiate between (*a*) chlorosis; (*b*) progressive pernicious anemia, and (*c*) leukemia; (*d*) and mention the pathological changes occurring in these diseases.

2. Distinguish between the terms (*a*) illusion; (*b*) delusion, and (*c*) hallucination as used in diagnosis.

3. Uncinariasis; (*a*) definition; (*b*) etiology; (*c*) frequency; (*d*) modes of infection; (*e*) symptoms; (*f*) skin symptoms; (*g*) diagnosis; (*h*) prognosis; (*i*) treatment to minutest details.

4. Differentiate (*a*) aortic and (*b*) mitral valvular diseases of the heart.

5. Differentiate (*a*) aortic stenosis and (*b*) aortic insufficiency.

PEDIATRICS.

1. Define (*a*) inanition, (*b*) marasmus, (*c*) malnutrition. Give etiology, symptoms, diagnosis, prognosis, and treatment of each.

2. Define pemphigus. Give its etiology, symptoms, diagnosis, prognosis, and treatment.

3. Give etiology, symptoms, diagnosis, prognosis, prophylaxis, and treatment of ophthalmia neonatorum.

4. Define cholera infantum. Give its etiology, pathology, symptoms, diagnosis, prognosis, prophylaxis, and treatment.

5. Define erythema. Give its causes, symptoms, and diagnosis. Name five drugs which frequently cause an exythema.

OBSTETRICS.

1. Give diagnosis and treatment of placenta prævia coming under your care after the beginning of labor.

2. What difficulty would you expect to encounter in occiput-posterior position and how would you overcome it?

3. Under favorable conditions of mother, would you immediately repair a lacerated perineum? Give technique of repair in superficial and in complete median lacerations.

4. What would cause recurring postpartum hemorrhage?

5. Give direction for the immediate care of the infant.

GYNECOLOGY.

1. Define caruncle of urethra and give treatment.

2. When would you use the curette? Give steps of the operation in detail.
3. Name causes of hemorrhage in a non-pregnant uterus. Give treatment.
4. State causes of leucorrhea and give treatment.
5. State immediate and remote effects of gonorrhea in the female and give treatment.
6. State the early objective and subjective symptoms of cancer of the uterus. How would you treat same?
7. What is meant by plastic operation? Describe operation for perineorrhaphy and trachelorrhaphy.
8. Give symptoms and treatment of uterine fibroids.
9. Treatment of pruritus vulvæ.
10. Give varieties of fibroid tumors of uterus.

SURGERY.

1. Name the inflammatory diseases of the bones. Define fracture; dislocation. Give differential diagnosis. Mention cardinal principles to be observed in treatment of fractures. Describe reduction of dislocation of shoulder joint by Kocher's methods.
2. What agents are employed for the production of general anesthesia, and what are the contraindications respectively of the three principal ones?
3. Describe ligation of femoral artery at Scarpa's triangle. Describe anastomosis after its ligation. What arteries are required to be ligated in amputation at middle third of leg?
4. How are wounds classified? What are the sources of wound infection? Describe briefly aseptic and antiseptic treatment of wounds.
5. Give symptoms of cholecystitis. Give symptoms of gallstones in common duct. Give treatment. Describe intussusception. Volvulus.
6. Define hernia. Name varieties of abdominal hernia. What is hydrocele? Differentiate between hydrocele and scrotal hernia. Describe briefly any one operation for the radical cure of inguinal hernia.
7. Give differential diagnosis between concussion and compression of brain. Give classification of burns. State briefly the constitutional effects and give treatment of burns.
8. What is a tumor? How are they classified? Name principal malignant tumors. Name principal varieties of mild tumors.
9. What is chancre? Chancroid? Give diagnosis of each and treatment.
10. Name varieties of fistula in ano and give treatment. Describe an operation for removal of hemorrhoids. Give symptoms and treatment of ischiorectal abscess.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF GEORGIA.

ANATOMY.

1. The *apex* is in the fifth left intercostal space, about 3¼ inches from the median line. The *base* is on a line drawn from the second left interspace, about 2 inches from the median line, to the upper border of the third right intercostal cartilage, about 1¼ inches from the median line.

The *aortic valves* are behind the third intercostal space, close to the left side of the sternum. *Pulmonary valves,* in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. *Tricuspid valves,* behind the middle of the sternum, about the level of the fourth costal cartilage. *Mitral valves* behind the third intercostal space, about one inch to the left of the sternum.

2. The hepatic artery and portal vein pass *to* the liver; the hepatic veins pass *from* the liver.

The two vertebral arteries unite to form the basilar artery.

3. *The principal lobes of the brain are:* Frontal, parietal, occipital, temporosphenoidal, Island of Reil, and limbic lobe. The *principal fissures* are: The great longitudinal (separating the two cerebral hemispheres); the great transverse fissure (between cerebrum and cerebellum); the Sylvian fissure; the fissure of Rolando; the parieto-occipital fissure. *Meibomian glands* are small sebaceous glands situated in the tarsal plates of the eyelids; they are nearer the conjunctival surface.

4. *The twelve pairs of cranial nerves* are: (1) Olfactory. (2) Optic. (3) Motor oculi. (4) Trochlear or Pathetic. (5) Trifacial. (6) Abducens. (7) Facial. (8) Auditory. (9) Glossopharyngeal. (10) Pneumogastric or Vagus. (11) Spinal Accessory. (12) Hypoglossal.

The pneumogastric has the widest distribution. *Four principal points of distribution:* Heart, lungs, stomach, and larynx.

5. Deltoid, supraspinatus, infraspinatus, teres major, teres minor. The *Quadriceps extensor femoris* is the great extensor muscle of the leg; it covers the front and sides of the femur, and is below united in a single tendon, attached to the patella and to the tibia. It consists of four muscles: Vastus externus, vastus internus, crureus, and rectus femoris.

6. The *clavicle articulates with:* Sternum and scapula.

The *divisions of the vertebral column* are: Cervical, dorsal, lumbar, and sacral.

The *cervical vertebræ* have a foramen in the transverse process, for the transmission of vertebral artery. The *dorsal vertebræ* have facets or demifacets for articulation with the ribs.

7. The ANTERIOR MEDIASTINUM is bounded *in front* by the sternum; *behind,* by the pericardium; *at the sides,* by the pleuræ.

Subdivisions of alimentary canal: Mouth, pharynx, esophagus, stomach, small intestine (duodenum, jejunum, and ileum), large intestine (cecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid flexure, rectum).

8. The *ileocecal valve* is on the left side of the cecum, at the opening of the ileum into the colon. It consists of two semilunar segments, the upper of which is horizontal and is called the ileocolic; the lower is vertical, and is called the ileocecal. On each side is a ridge called the frenum.

Lobes of the liver: Right, left, caudate, quadate, and Ipigelian.

Fissures of the liver: Umbilical, transverse, of the gall-bladder, of the ductus venosus, of the inferior vena cava.

9. "The kidneys are placed in the loins, one on each side of the vertebral column. Morris lays down the following rules for indicating the position of the kidney on the posterior surface of the body: '1. A line parallel with, and one inch from, the spine, between the lower edge of the tip of the spinous process of the eleventh dorsal vertebra and the lower edge of the spinous process of the third lumbar vertebra. 2. A line from the top of this first line outward at right angles to it for two and three-quarters inches. 3. A line from the lower end of the first transversely outward for two and three-quarters inches. 4. A line parallel to the first and connecting the outer extremities of the second and third lines just described.'" (Gray's *Anatomy.*)

Renal artery passes to each kidney, and renal vein passes from each kidney.

10. *Uterus.* In the nulliparous adult the uterus is about three inches long, about two inches wide at the upper part, and about one inch thick. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity, and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments —broad ligaments, round ligaments, vesicouterine, and rectouterine.

Divisions of male urethra: Prostatic, membranous, and spongy.

The under surface, lower half of posterior surface, and lower two-thirds of anterior surface of the bladder are generally uncovered by peritoneum; the fuller the bladder the more of the anterior surface uncovered.

PHYSIOLOGY.

1. *Human physiology* is that branch of science which treats of the functions of the human body in a state of health.

2. The digestive apparatus consists of: mouth, pharynx, esophagus, stomach, small intestine (duodenum, jejunum, and ileum); teeth, salivary glands, liver, and pancreas.

3. (*a*) *Chyme* is a semi-solid mass of partly digested food at the end of stomach digestion, when it is ready to be passed on into the duodenum.

Chyle is the fluid taken up by the lacteals from the intestine during digestion. (*b*) *The functions of the bile* are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach and thus inhibits peptic digestion; (7) it has very feeble antiseptic action. The amount of bile secreted varies from about a pint to a quart (in twenty-four hours).

4. The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unite to form the portal vein, and (2) by the lymph vessels of the small intestines, which converge to empty into the thoracic duct. The water, inorganic salts, proteids, and sugar go by way of the portal vein to the ascending vena cava; and the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

5. *Systole* is the period of contraction of the heart, chiefly of the ventricles. *Diastole* is the period of dilatation of the heart, chiefly of the ventricles.

There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged; the second, or diastolic, sound is sharper and shorter. The *causes* producing the *first* sound of the heart are not definitely ascertained; the following are supposed to be causatory factors: (1) The vibration and closure of the auriculoventricular valves, (2) the muscular sound pro-

duced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall. The *second* sound is caused by the vibration due to the closure of the semilunar valves.

6. The *ductless* glands are: The spleen, thymus, thyroid, parathyroids, suprarenals, carotid, coccygeal, pituitary, and pineal glands.

The function of the spleen: The following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blood corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin.

The function of the thyroid is not definitely settled; (1) it has some trophic function, regulating oxidation in the body, and it is supposed to have also a special influence on the vasomotor nerves, the skin, the bones, and on the sexual functions; (2) it is supposed to antagonize toxic substances, and (3) it produces an internal secretion.

The *function of the thymus* is not settled; it is said: (1) To be a blood-forming organ; (2) to have influence on growth and nutrition; (3) in hibernating animals it is supposed to store up materials which can be utilized during the period of inactivity.

The *function of the suprarenals* is not definitely settled; they produce an internal secretion which is probably necessary to life; it is supposed that they are able to destroy or remove some toxic substance produced elsewhere in the body.

The function of the *other* ductless glands is unknown. They all, or nearly all, furnish an internal secretion.

7. *The function of the Eustachian tube* is to keep the atmospheric pressure within the tympanic cavity the same as that on the outside.

The function of the semicircular canals is to aid in preserving equilibrium and in giving an idea of one's position in space; it is also believed, by some, that the semicircular canals aid in keeping the muscles of the body in a state of *tonus*.

8. The *red blood corpuscles* are biconcave discs, about 1-3200 of an inch in diameter; they are nonnucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They are elastic and soft, and their shape is changed by pressure, but is promptly regained on the removal of the pressure. Their color is yellowish. They contain hemoglobin. Their *function* is to carry oxygen from the lungs to the tissues.

In the *embryo* the red blood corpuscles are derived

from cells in the vascular area of the mesoblast; in the *adult* they are derived chiefly from the red marrow of bones, also from the spleen.

The white blood cells are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their *functions* are (1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

9. Muscles are divided into two great classes: Voluntary and involuntary. *Voluntary* muscle is striated, has long, narrow fibers with cross striations and many nuclei beneath the sarcolemma. *Involuntary* muscle is non-striated, has spindle-shaped fibers, one nucleus centrally located, and no sarcolemma. The great exception is cardiac muscle, which is involuntary and also striated.

Non-striated muscle is called involuntary, because it is not under the control of the will.

10. The rapid breathing in pneumonia is due partly to the loss of functioning surface in the lung, partly to the fever and to the toxemia. The pneumonia patient needs fresh air to aid the aeration of the blood, to tone up the cardiovascular system, to lessen the cyanosis, and to diminish the toxemia.

The *vital capacity of the lungs* is the sum total of the complementary, tidal, and reserve air; it is about 225 to 230 cubic inches, and represents the amount of air which a person can expel from his lungs after the deepest possible inspiration.

CHEMISTRY.

1. *Chemistry* is that branch of science which treats of the composition of substances, their changes in composition, and the laws governing such changes. *Organic chemistry* is the chemistry of the carbon compounds.

Inorganic chemistry is the chemistry of substances which do not contain carbon.

2. A *molecule* is the smallest quantity of any substance which can exist in a free state.

An *atom* is the smallest quantity of an element which

can enter into chemical action or that can enter into the composition of a molecule.

An *element* is a kind of substance which we cannot, by any known means, split up into any two or more dissimilar substances.

Synthesis is the process of forming compounds out of simpler compounds or elements.

Valence is the combining power of an atom of an element (or radical) as compared with that of an atom of hydrogen.

3. *Nitric acid* is made by the decomposition of potassium nitrate by sulphuric acid:

$$KNO_3 + H_2SO_4 = KHSO_4 + HNO_3.$$

Hydrochloric acid is made by the action of sulphuric acid on sodium chloride:

$$H_2SO_4 + 2NaCl = Na_2SO_4 + 2HCl.$$

4. An *acid* is a compound of an electronegative element or radical with hydrogen, part or all of which hydrogen it can part with in exchange for an electropositive element, without the formation of a base. *Examples:* H_2SO_4, sulphuric acid; HNO_3, nitric acid.

A base is a compound which on entering into double decomposition with an acid produces a salt and water. *Examples:* KOH, potassium hydroxide; NH_4OH, ammonium hydroxide.

A *salt* is a substance derived from an acid when the hydrogen of the latter has been partially or completely replaced by an electropositive element or elements (a metal or metals). *Examples:* $KHSO_4$, monopotassic sulphate; K_2SO_4, dipotassic sulphate.

5. Table salt, NaCl; cooking soda, $NaHCO_3$; Epsom salts, $MgSO_4$; calomel, Hg_2Cl_2; corrosive sublimate, $HgCl_2$; acetic acid, CH_3COOH; iodoform, CHI_3; blue vitriol, $CuSO_4$; sal ammoniac, NH_4Cl; plaster of Paris, $CaSO_4$.

6. *Chemical antidote,* for *carbolic acid,* alcohol, or a soluble sulphate; *nitric acid,* magnesia, or soap; *zinc salts,* sodium or potassium carbonate, milk; *lead salts,* magnesium sulphate; *iodine,* starch; *caustic alkali,* dilute vinegar; *tartar emetic,* tannin; *strychnine,* tannic acid; *phosphorus,* old French oil of turpentine; *sulphuric acid,* magnesia.

7. The *chemical antidote for arsenic poisoning* is freshly prepared ferric hydroxide. The ferric hydroxide changes the arsenic into ferrous arsenate, which is non-poisonous.

Test for arsenic: Reinsch's test is as follows: To the suspected fluid add a little pure HCl; suspend in the fluid a small strip of bright copper foil, and boil. If a deposit forms on the copper, remove the copper, wash it with pure water, dry on filter paper, but be careful not to rub off the deposit. Coil up the copper, and put it into a clean dry glass tube, open at both ends, apply heat at the part

where the copper is. If arsenic is present there will appear in the cold part of the tube a mirror, which will be found on microscopical examination to consist of octahedral crystals of arsenic trioxide.

8. An *alkaloid* is a basic nitrogenous substance capable of combining with acids to produce salts in the same way that ammonia does. *Belladonna,* atropine; *cinchona,* quinine; *pilocarpus,* pilocarpine; *nux vomica,* strychnine; *hyoscyamus,* hyoscyamine, *erythroxylon coca,* coacaine; *opium,* morphine, codeine, narcotine, and papaverine.

9. *Test for albumin*: "The urine must be perfectly clear. If not so, it is to be filtered, and, if this does not render it transparent, it is to be treated with a few drops of magnesia mixture, and again filtered.

"The reaction is then observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline, it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present, a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of nitric acid."

Test for sugar: First remove any albumin that may be present, then "render the liquid strongly alkaline by addition of sodium carbonate. Divide about 6 c.c of the alkaline liquid in two test-tubes. To one test-tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color."

Test for indican in the urine: The urine is mixed with one-fifth its volume of 20 per cent. solution of lead acetate and filtered. The filtrate is mixed with an equal volume of fuming hydrochloric acid containing 3:1,000 of ferric chloride, a few drops of chloroform are added, and the mixture strongly shaken one to two minutes. With normal urine the chloroform remains colorless, or almost so; but if an excess of indoxyl compounds be present the chloroform is colored blue, and the depth of the color is a rough indication of the degree of the excess. (From Witthaus' *Essentials of Chemistry.*)

There is an increased elimination of urine: In diabetes, chorea, hysteria, epilepsy, granular atrophy of the kidneys; after the ingestion of much fluid, and during the absorption of large effusions.

10. Sulphur dioxide, SO_2 is a good disinfectant where penetration is not required. The presence of moisture is necessary, when $H_2O + SO_2 = H_2SO_3$. This sulphurous acid is really the disinfecting agent.

MATERIA MEDICA AND THERAPEUTICS.

1. (*a*) Pepsin and pancreatin. (*b*) Pepsin is only of use in an acid medium, as in an alkaline medium it is decomposed; pancreatin acts in an alkaline medium. Pancreatin is preferred for the predigestion of albuminous foods; and pancreatin alone will digest other kinds of foods. Hence pancreatin is of more use than pepsin. (*c*) Pepsin is made from the glandular layer of the fresh stomach of the hog; pancreatin is made from the fresh pancreas of the hog.

2. *Hot pack.* "A bed is prepared by covering it with a rubber blanket. Over this is placed a dry woolen blanket. A large, heavy blanket is now dipped in very hot water and then wrung out, and the naked patient quickly wrapped in it, the dry blanket being folded over him after several hot-water bottles have been placed alongside the patient. Finally the sides of the rubber sheet are drawn around and over the patient and an ice-cap placed on the head. A thermometer should be placed in the mouth every half hour, and if the patient's temperature becomes febrile (101°) he should be taken out of the blankets and rubbed dry."—(From Hare's *Practical Therapeutics.*)

The hot pack is used, not only to cause sweating and so relieve the patient of poisons and fluid in renal diseases, but also to relax muscle spasm and to relieve nervous excitement and nervous insomnia. It is particularly efficacious in the nervous insomnia of severe chorea in children.

3. BELLADONNA AND ITS PREPARATION. *Physiological effects:* Anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood-pressure, but toxic doses cause the blood-pressure to fall, stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

Medicinal uses: To relieve pain, relax spasm, check sweating, as a mydriatic, for night sweats, to check griping of purgatives; in asthma, to check fevers, in heart disease, shock and collapse, acute coryza, urinary incontinence, chordee, low delirium of fevers, mania, alcoholism; as an antigalactagogue, and for spasmodic cough.

4. ERGOT. *Physiological action:* Ergot stimulates and causes contraction of involuntary muscle fibers, hence it is a vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative, it raises the blood-pressure, it increases peristalsis, and is an emmenagogue. *Principal therapeutic uses:* To promote uterine contractions during third stage of labor; fibroids, menorrhagia, postpartum hemorrhage. Some forms of amenorrhea and dysmenorrhea, dysentery, arterial hemorrhage, congestive headaches, laxity of sphincters, of bladder or rectum, hemorrhoids, aneurysm, dia-

betes, urinary incontinence, direct paralysis of the sphincter vesicæ, atonic spermatorrhea.

5. *Turpentine* is used as a rubefacient or counterirritant; in sciatica, lumbago, neuralgia, chronic rheumatism, sprains, dysentery, hemorrhage of intestines; as a vermifuge against tapeworm; chronic bronchial affections and chronic affections of the genitourinary tract.

PATHOLOGY.

1. *The lymphatic glands are enlarged* in: Hodgkin's disease, lymphatic leukemia, filariasis, syphilis, malignant disease, tuberculosis, gonorrhea, adenitis, and sometimes in some of the acute infectious diseases.

2. *Pathology of erysipelas:* Sections of the affected skin reveal an infiltration with granular leucocytes and serum, often including many micrococci, and involving the subcutaneous cellular tissue and to a variable depth the fat. The leucocytes are most numerous in the capillaries and lymph-spaces of the outer zone, where the disease is advancing; they are also numerous around the hair follicles and sweat glands. Pus is formed in the worst cases. The edema is most pronounced in loose cellular tissue, as beneath the eyelids and the prepuce. Ascesses and infarction are occasionally found in the lungs, spleen, and kidneys. (French's *Practice of Medicine.)*

3. In *diphtheria,* there is little fever, the membrane is *in* and not *on* the surface of the throat, it bleeds on removal, and forms again. The opposite of all this is the case in tonsillitis, and further, the crypts of the tonsils may be visible.

4. *Acute polimyelitis:* "The lesions may be unilateral or bilateral, and are more common in the lumbar region. Early in the disease the blood-vessels of the anterior horns of the gray matter are distended, and the perivascular lymph-spaces filled with round-cells. Small interstitial hemorrhages may be present in the anterior horns. The ganglion-cells become larger, granular, and cloudy, often vacuolated, and altered in their staining reactions. The cells eventually become completely degenerated and disappear, the medullated nerves lose their covering, and many are destroyed. Neurogliar hyperplasia occurs in the involved areas, and the gray matter may become much indurated." (McConnell's *Pathology.)*

5. *Acute parenchymatous nephritis:* Kidneys are enlarged, dark red, capsule is tense and strips off easily; disease is bilateral; cortex mainly involved; Bowman's capsule is filled with fluid; degeneration in the glomeruli; the cells of the tubules are swollen and show granules, cloudy swelling and fatty degeneration; casts are present.

6. *Intestinal ulceration* is an essential feature in: (1) *Typhoid fever,* in which it occurs chiefly in Peyer's patches, and opposite the mesenteric attachment; (2) *Tuber-*

culosis of intestine, in which it may occur in any part of the intestine; (3) *Peptic ulcer of the duodenum;* (4) *Burns,* chiefly found in duodenum; (5) *Syphilis of intestine,* in Peyer's patches, and lower part of intestine and rectum; (6) *Dysentery,* generally large intestine (cecum, rectum, and hepatic and sigmoid flexures).

8. *Congestion* is excess of blood in the more or less dilated vessels of a part. It is the first step in inflammation. *Inflammation* is the series of changes occurring in a part as the result of injury (or bacteria), provided the injury is not sufficient to kill the part.

9. In *appendicitis:* The mildest and the severest cases show no leucocytosis. The total absence of leucocytosis in a case not obviously mild is a very bad prognostic sign. An increasing leucocytosis means a spreading process, and may be the only evidence of the fact. A steadily increasing leucocytosis is always a bad sign; it is of far more significance than a larger count which does not increase.—(Cabot.)

10. Pyogenic organisms: *Staphylococcus pyogenes aureus, Staphylococcus pyogenes albus, Staphylococcus pyogenes citreus, Streptococcus pyogenes, Streptococcus erysipelatis,* typhoid bacillus, genococcus, tubercle bacillus.

The *Staphylococcus pyogenes aureus* is a small round cell which appears in clusters like a bunch of grapes; its diameter is about 0.8 to 1.0 micron; it is facultative anaërobic, has no flagella, is not motile, it stains readily with the anilin dyes, and is not decolorized by Gram's method; it forms an orange pigment on gelatin, potatoes, and other media; it also liquefies gelatin.

Staphylococcus pyogenes albus is about the same as the *Staphylococcus pyogenes aureus,* except that it does not form a pigment, and its colonies are of a white color.

Staphylococcus pyogenes citreus is about the same as the *aureus* and *albus,* except that its growth is of a lemon yellow color.

The *Streptococcus pyogenes* is a micrococcus, of spherical shape, and arranged in chains of about thirty or forty cocci (in liquid media), but the chains are much shorter in solid media. Each coccus is about one-half to two microns in diameter. It is not motile, does not form spores, does not liquefy gelatin, and stains readily with the ordinary anilin dyes, and by Gram's method.

Bacillus typhosus is a rod-shaped organism, with rounded ends, is from 2 to 4 microns in length, and about three-fourths of a micron in breadth; it does not stain by Gram's method, but stains with all the anilin dyes; it has flagella, no spores, is aërobic and is motile.

Streptococcus erypsipelatis appears in chains of varying lengths or in tangled masses, the presence or absence of

oxygen does not seem to be of much importance, it grows at room temperature, and has the cultural characteristics of the *Streptococcus pyogenes.*

The *Gonococcus* is a diplococcus with a special predilection for the mucous membrane of the urethra; it is sometimes found on the conjunctiva. The appearance is that of two coffee beans; the gonococcus is found in the pus cells, stains with ordinary anilin dyes, but not by Gram's method. It is aërobic, and can be cultivated on human blood serum; it will not grow on gelatin, agar, bouillon, or potatoes. It was discovered by Neisser.

The *Tubercle bacillus* is rod shaped, is from 1½ to 3½ microns in length and about one-third to one-half a micron in breadth, is a strict parasite, is not motile, and has no flagella. It is slightly curved, does not form spores, is not liquefying, and nonchromogenic, is aërobic; it resists acids; it grows well on blood serum; stains well by Ehrlich's, Ziehl-Nielsen's, or Gabbett's method; it is Gram-positive.

PRACTICE OF MEDICINE.

1. In *chlorosis,* there is a diminution of hemoglobin, but not of red cells or of leucocytes; the red cells are misshapen.

In *pernicious anemia* the blood would show: (1) A diminution in the number of red corpuscles; (2) a relative increase in the amount of hemoglobin; (3) poikilocytosis; (4) the presence of nucleated red cells; (5) variation in the size of the red cells; (6) the leucocytes *may be* diminished.

In *leukemia* there is a large leucocytosis, chiefly of the lymphocytes; myelocytes may be present, and lymph glands are enlarged.

Chlorosis has been held to be due to: Adolescence, female sex, constipation, excessive loss of blood.

Pernicious anemia shows the liver rich in iron and pigment cells. It is due to excessive destruction of the red cells of the blood. *Leukemia* shows an enlarged spleen with thickened capsule and hemorrhagic infarcts; the lymphatic glands are enlarged and softened. The liver is enlarged.

2. A *delusion* is a belief in something which has no real existence, but is purely imaginary; and out of which the person cannot be reasoned. An *illusion* is a false or perverted impression, received through one of the senses. An *hallucination* is the same as an illusion, but without any material basis.

If an individual believes himself to be made of glass, and is afraid of being touched lest he be broken, he is suffering from a *delusion.* If the whistling of the wind is mistaken for a voice telling a person to do a certain thing—that would be an *illusion.* If a person fancied he heard a voice

when there was nothing at all to be heard, that would be an *hallucination.*

3. *Uncinariasis* is hook-worm disease. It is caused by the anchylostomum duodenale and the uncinaria Americana. It is very common in certain States and countries (Egypt, Porto Rico, mining districts and tropical places). Infection is by the digestive tract and also through the skin. The blood shows anemia; stunted growth; pale mucous membranes; anxious expression of face; visible apex beat; prominent abdomen due to enlargement of liver and spleen; edematous and ulcerous feet; perverted appetite; diarrhea or constipation; eosinophilia. The skin is waxy white or yellowish. Diagnosis is made by finding the ova in the feces.

Prognosis is favorable with proper care and treatment. *Treatment* consists in enforcing the wearing of shoes, the use of proper water-closets, cleanliness of person (including hands); disinfection of privies; examination of the stools of suspected persons; and burning contaminated stools. The patient is put on fluid diet; in the evening he is given a saline and no food, and in the morning about 40 grains of thymol, and in a few hours another saline. This may be repeated in about a week, if necessary. All water to be used for drinking should be boiled.

4.

AORTIC DISEASE.	MITRAL DISEASE.
Symptoms are mainly due to anemia, viz.:	Symptoms are mainly due to venous congestion, viz.:
1. Pallor.	1. Cyanosis.
2. Throbbing of the carotids.	2. May get pulsation in the veins of the neck.
3. Attacks of an "angina pectoris" type of pain.	3. Sudden attacks of severe dyspnea—actual acute pain is rare.
4. Breathlessness on slight exertion.	4. Breathlessness, but often present without exertion.
5. Nervous symptoms are prominent, owing to cerebral anemia. Syncopal attacks are also common.	5. Pulmonary symptoms are most prominent, *i.e.* cough in the morning, chronic bronchitis, hemoptysis, dilated right side of heart, and later symptoms due to tricuspid leakage.
6. The *left ventricle* is usually much hypertrophied.	6. The *left auricle* is somewhat hypertrophied, but the main hypertrophy is that of the *right ventricle.*

—(From Wheeler and Jack's *Handbook.*)

5.

AORTIC STENOSIS.	AORTIC REGURGITATION.
1. Absent.	1. Capillary pulse (Quincke's) is present over the skin, finger-nails, and mucous surfaces.
2. Arteries not well filled with blood at each systole.	2. Arteries well filled at each systole.
3. Arteries are not seen to pulsate.	3. Throbbing of the arteries of the arms and extremities.
4. Pulse slow and small, systolic thrill felt at base.	4. Characteristic "trip-hammer" pulse. Thrill uncommon, diastolic in time.
5. Cardiac hypertrophy moderate.	5. Hypertrophy of the left ventricle extreme.
6. Murmur rather harsh, systolic in time, and transmitted to the vessels of the neck.	6. Murmur less harsh, and usually soft in character, diastolic in time, transmitted downward along the sternum or toward the apex.

(Anders and Boston's *Diagnosis.*)

PEDIATRICS.

1. *Inanition* is exhaustion from lack of food or from food that has not been assimilated. *Marasmus* is extreme emaciation or atrophy, not due to any specific or obvious cause. *Malnutrition* is faulty nutrition due to non-assimilation of food.

INANITION may be *due* to the child refusing food, or only taking a very small amount; inadequate or improper food; feeble powers of digestion. *Symptoms:* Loss of weight, temperature high or subnormal, pulse weak and rapid, urine scanty and diminished chlorides; cold extremities, muscular relaxation, pallor, cyanosis, collapse. *Prognosis* uncertain. *Diagnosis:* It is distinguished from malnutrition by its greater severity, and from marasmus by its more acute character. It may be mistaken for indigestion meningitis, gastroenteritis. *Treatment:* Procure a wet nurse if necessary, breast milk should be diluted and given with a spoon or medicine dropper, whey mixtures or rectal feeding may be tried, rectal injections of salt solution, spraying or tepid baths, and stimulants are all indicated.

MALNUTRITION may be hereditary, due to syphilis or tuberculosis, or alcoholism or gout, prematurity or improper feeding. *Symptoms:* Weight is subnormal, development poor, the head is relatively large, mentally

the child may be bright, indigestion is common, anemia may be present. *Diagnosis:* Must distinguish between tuberculosis, syphilis, rickets, malaria, blood diseases, organic conditions; the etiology must be studied. *Prognosis* depends on the cause and the possibility of its removal. *Treatment* is mainly dietetic and general, drugs are of small service. Food must be according to the child's digestive capacity. Regular hours, freedom from excitement, open-air exercise, limited mental work, tonics, cold spraying, etc.

MARASMUS may be congenital, due to poverty or artificial feeding, overcrowding. *Symptoms:* Loss of weight, an old look, wrinkled skin, legs like drum sticks, prominent abdomen, hollow temples, shrunken fontanels, large eyes, sharp features, anemia, hemic murmur, edema, vomiting, loss of appetite. *Diagnosis* depends on symptoms, but it may be difficult to differentiate it from malnutrition. *Prognosis* depends on age of infant and extent of disease. *Treatment* consists in proper feeding and fresh air; good cow's milk or wet nurse's. No drugs are required.—(From Holt.)

2. PEMPHIGUS is an eruption of bullæ on a red base with serous contents. It may be due to traumatism, or syphilis, or infection. There is a bullous eruption on abdomen, neck, face, or thighs; generally first seen on trunk; the bullæ may rupture in one or two days and a crust forms, which latter falls off, leaving a red or violet patch on the skin. The important point in the diagnosis is to distinguish between the syphilitic and non-syphilitic variety. *Prognosis* is variable; good when there are but few bullæ, serious when many are present. *Treatment* consists in cleanliness, antiseptic powders or lotions, or a 1 per cent. solution of ichthyol.

3. OPHTHALMIA NEONATORUM. *Causes:* The gonococcus or some other pyogenic microorganism; the secretions of the mother contain the infecting agent, and transmission may occur directly during parturition, or indirectly by the fingers of physician or nurse, cloths, instruments, etc. *Symptoms:* Swollen eyelids, with copious purulent discharge; ulceration of the cornea may ensue. *Prophylaxis:* Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth. *Treatment:* Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient

must be isolated, and all cloths and compresses used must be burnt.

4. *Cholera Infantum:* An acute infectious disease occurring in children under two years of age, closely resembling Asiatic cholera. It is a severe form of gastrointestinal infection, due to the toxins of the bacteria in milk. It occurs in hot weather among the poor in large cities. *Symptoms:* Diarrhea is the initial symptom. The stools are more or less fecal, but soon become watery, colorless, and odorless. In some cases they may be of a brownish-green color with a musty odor. There are restlessness, high fever (105-108° F.), thirst, vomiting, and purging. The child rapidly wastes, and the surface temperature falls. The urine is scanty or suppressed, and the child becomes apathetic, which condition may pass on to convulsions, stupor, and death. *Treatment:* Ordinary diarrhea should be prevented from terminating in cholera infantum. The stomach and colon should be irrigated. From ℥ 2-4 of water at 100° F. should be allowed to flow into the stomach through a soft-rubber catheter and be siphoned out. This should be done only once. For the colon, sodium bicarbonate, ℥i, should be added to the pint, and the irrigation performed twice daily. If the rectal temperature is very high, ice-cold water should be used; otherwise warm water. When symptoms of collapse appear, hot pack is used. Ice-water quenches the thirst, even if it is vomited. Champagne and drop-doses of brandy may be given if the stomach is tolerant. Strychnin, gr. 1/100-1/48, hypodermically, to a child 1 year old, is a valuable stimulant. Morphin, gr. 1/100, and atropin, gr. 1/800, may be given in the same way and repeated every hour until the child is quieted. The course is short, and the prognosis is grave. Enterocolitis and bronchopneumonia often follow. During convalescence barley-water, acacia-water, etc., may be given. (*Pocket Cyclopedia.*)

5. "*Erythema simplex* is a circulatory disturbance of the integument characterized by variously sized and shaped areas of redness unattended by elevation or depression. It is accompanied by mild itching or burning, and disappears on pressure. It may be due to exposure to extremes of temperature, exposure to the sun's rays, injury, irritation of poisonous plants, or to the absorption of drugs, antitoxins, ptomaines, etc.

"*Erythema intertrigo* or chafing is the variety of hyperemia encountered in regions such as the buttocks, genital regions, and flexures of joints, in which the skin surfaces are in apposition and rub one on the other. In the obese and in infants it is very frequent and often develops into a true dermal inflammation. Redness, heat, and burning

are symptoms; and sometimes there may be a mucoid discharge."—(Hughes' *Practice of Medicine.*)

Five drugs which may cause erythema: Belladonna, quinine, morphine, salicylic acid, chrysarobin.

OBSTETRICS.

1. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Treatment:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

2. The difficulty to be expected is posterior rotation. *Management:* In many cases anterior rotation occurs; an attempt should be made to rotate the shoulders by external manipulation. If this fails the vertex may be rotated anteriorly by inserting a hand in the uterus and grasping the head. Have the patient lie on the same side that the back of the child is on; this causes the fundus of the uterus to gravitate downward and favors anterior rotation. If pelvis and child are of relative size, podalic version may be performed. If some anterior rotation has been gained by other methods, the Simpson axis traction forceps may be applied and traction made in axis of the pelvic inlet; the vertex may rotate anteriorly. If direct posterior rotation has occurred, apply the Tarnier axis traction forceps and deliver in flexion. (*Landis' Obstetrics.*)

3. All tears should be repaired as soon as possible (unless there are contraindications). A primary operation is best because the edges are fresh and can be approximated; little (if any more) anesthetic is wanted; the woman has to lie in bed, and therefore only one absence from household work is requisite; infection is less likely. In any case, operation may prevent rectocele, cystocele, prolapse of uterus, and general weakness, malaise, and disability.

Operation for lacerated perineum: "The labia are seized with Allis' forceps at the level of the lowest carunculæ myrtiformes. A guide stitch is placed in the posterior vaginal wall directly under the external urinary meatus. By pulling one Allis forceps and the guide stitch in opposite directions outward and downward, the posterior sulcus is exposed; denudation is required, even in a recent tear, for a part of it is always submucous. The other sulcus is exposed and denuded. Then by holding the guide stitch upward in the middle line and pulling the forceps apart the mucous membrane between the sulci is denuded or freshly torn surfaces covered with granulation-tissue

are scraped with the edge of a knife. The ruptured levator ani muscle in the posterior sulci is united with a double tier suture of chromic gut, two half-hitches being taken in the stitch as it turns upward after coming down from the apex of the wound, in its deeper portion to the base. One knot at the apex of the sulcal denudation secures the stitch. The retracted ends of the transversus perinei and bulbocarvernosus muscles are brought together by silk-worm sutures. Finally, a single stitch at the top of the perineal wound unites the posterior commissure of the vulva, restoring the fossa navicularis. The perineal stitches are knotted; they are removed on the twelfth day." (Hirst's *Obstetrics.)*

4. *Recurring post-partum-hemorrhage may be caused* by: Relaxation of uterus, laceration of birth canal and uterine inertia.

5. *Care of infant:* "After the cord has been ligated and cut, the eyes should be cleansed with a saturated solution of boric acid, after which, if there is any vaginal discharge from the mother, 1 or 2 drops of a 1 per cent. solution of silver nitrate should be instilled in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100° F., carefully dried, and the cord dusted with some antiseptic powder. Sponging should be practised for ten days, after which a full tub-bath at 98° F. should be given daily for 6 months. The temperature may then be reduced to 95° F., and at the end of a year to 90° F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel, and dusting-powders should be used to prevent chafing. An infant may be taken out-of-doors in summer when one week old, and in winter on pleasant days at 3 months of age. The new-born infant should sleep about 22 hours out of a possible 24, gradually diminishing this until at 2 years the child should sleep at least 12 hours of the day, and at 3 years not less than 11. The sleeping-room should be well ventilated.—(Gould and Pyle's *Pocket Cyclopedia.)*

GYNECOLOGY.

1. *Urethral caruncle* is a small red fleshy growth generally situated on the posterior part of the meatus of the urethra. There are local pain and tenderness, which may be excessive; a burning sensation is experienced on urination; it may bleed. The proper treatment is to excise it or destroy it with the thermocautery.

2. CURETTAGE. *Indications:* For diagnosis, to remove

pieces of retained placenta or decidua, endometritis, mucous polypi, hemorrhage, dysmenorrhea, endocervicitis. *Dangers:* Sepsis, perforation of uterus, hemorrhage, abortion, inflammation of uterus or adnexa. *Procedure:* All antiseptic and aseptic precautions are necessary, the patient should be in the dorsal position, the vagina is to be disinfected, and the cervical canal dilated; a speculum is introduced into the vagina and the cervix is drawn down with volsella; the uterine cavity is irrigated with creolin or lysol; a curette is inserted to the fundus and moved down to the internal os; the operator should begin at one cornu, and go in the same direction all around till he reaches the starting point, and if necessary repeat till no more spongy or hyperplastic tissue appears; the fundus should be scraped separately by moving the curette along it from side to side; in going towards the fundus no scraping should be done, and care must be taken not to perforate the uterus; should this happen no fluid must be injected; otherwise the uterus and vagina are again irrigated, and one or more strips of iodoform gauze are inserted into the cavity to act either as a hemostatic plug or as a drain, which is diminished with two days' interval and withdrawn on the sixth day. A hemostatic tampon should be placed in the vagina and withdrawn the following day. If any fever arises the tampon is at once removed and the vagina douched with antiseptic fluid every three hours. If not, the vagina is only swabbed with the same every day, and packed loosely with iodoform gauze. After the final removal of the gauze the antiseptic douche is given twice a day until there is no more discharge. The patient should remain in bed for a week.

3. *Hemorrhages occurring in the non-pregnant woman:*

A. In virgins before the age of thirty: Caused by (1) uterine congestion, the result of cold or exposure; (2) endometritis; (3) polypi and fibroid tumors.

B. In married women before the age of thirty: Caused by (1) subinvolution; (2) laceration of the cervix; (3) endometritis; (4) retrodisplacements of the uterus; (5) polypi and fibroid tumors.

C. In women after the age of thirty: Caused by (1) carcinoma of the cervix; (2) carcinoma of the body of the uterus; (3) sarcoma of the uterus.

4. *Leucorrhea may be produced by:* Pelvic congestion, endometritis, retroversion of uterus, vulvitis, vaginitis, gonorrhea, benign and malignant growths.

Treatment consists in removal of cause, rest, vaginal douches (cleansing, or astringent, or antiseptic, according to the cause).

5. GONORRHEA. *Symptoms:* Pain and burning in the vulva; pain and burning on micturition; dyspareunia; yel-

lowish or greenish discharge, in which the gonococcus can be found; the vagina is hot, red, swollen, and tender. *Possible results:* Cystitis, urethritis, vulvitis, endometritis, salpingitis, septic peritonitis, sterility, condylomata of vulva, abscess of Bartholin's glands.

Treatment: Rest, if possible in bed; freedom from alcoholic or sexual excitement; a mild and unirritating diet; salines and diuretics; plenty of water to drink; a warm sitz bath; douching of vagina with about a gallon of a 1:5000 bichloride solution, or of borax (1 dram to the quart); the douche is to be taken in the recumbent position.

6. *Signs of cancer of uterus:* Hemorrhage, leucorrhea, foul-smelling discharge, pain, and (later) cachexia. *Treatment* consists of hysterectomy.

7. *Plastic operations in gynecology* are such as are done: (1) for the repair of lacerations of the perineum or cervix; (2) for vaginal fistulæ; (3) for the narrowing of the vagina, and the treatment of cystocele or rectocele; and (4) various other operations on vulva, urethra, or anus.

For *perineorrhaphy*, see OBSTETRICS, Question 3.

Trachelorrhaphy: "For trachelorrhaphy the two lips of the cervix are seized with double tenacula and pulled down, an Auvard's speculum retracting the posterior vaginal wall. Denudation is resorted to if necessary. The raw surfaces are united with interrupted sutures of chromic gut. Care must always be exercised to leave a wide cervical canal. For amputation of the cervix, which is required when the injury or sloughing leaves a condition irreparable by plastic surgery, a circular incision is made above the site of the injuries and the cervix is amputated in healthy tissue. The sutures of chromic gut are inserted according to the modified Hegar plan." (Hirst's *Obstetrics.*)

8. UTERINE FIBROIDS are very common. "They are benign, but are harmful on account of the disturbance produced by them when enlarged, and also on account of the various degenerations which they are likely to undergo. . Menorrhagia, metrorrhagia, and pain are the common symptoms of the growths, although in patients with large intestinal and subserous fibroids hemorrhage may be absent. In cases of the submucous tumors (fibroid polypi) bleeding may be extreme. The tumors are usually of slow growth, but sometimes they increase very rapidly in size, causing serious pressure symptoms. The diagnosis is sometimes very difficult and always impossible without physical examination. Uterine fibroma may coexist with pregnancy.

The treatment consists in removal. In cases of subserous fibroid the snare may be used when it is pediculated. and when sessile the capsule may be cut and the growth enucleated. In the subserous and interstitial va-

riety if the patient can be kept under observation and the tumor is small, operation should be postponed; otherwise a choice should be made between removal of the uterine appendages, ligation of the uterine arteries through the vagina, myomectomy, and hysteromyomectomy."—(Gould and Pyle's *Pocket Cyclopedia.)*

9. *Treatment of pruritus vulvæ* consists in removing the cause, if possible; cleanliness, fresh air, tonics, and general attention to hygiene; local applications of solution of bichloride of mercury, 1:2000; or carbolic acid, 1:100; or lead and opium; dusting powders of bismuth subnitrate, calomel, or zinc oxide are also useful.

10. FIBROIDS. *Varieties:* (1) Subperitoneal or subserous; (2) interstitial, in the uterine tissue; and (3) submucous in the endometrium.

SURGERY.

1. The *inflammatory diseases of bone* are: Periostitis, ostitis, and osteomyelitis. *Fracture* is a sudden solution in the continuity of a bone brought about by violence.

Dislocation is a displacement of the articular end of a bone.

FRACTURE.	DISLOCATION.
1. Crepitus may be present.	1. Crepitus never present.
2. Preternatural mobility.	2. Rigidity rather than mobility.
3. Easily reduced—but	3. Difficult to reduce—but
4. Deformity more liable to recur after reduction.	4. Deformity less liable to recur after reduction.
5. The head of the bone is in its proper place.	5. The head of the bone is not in its proper place.
6. The socket containing the head of the bone is not empty.	6. The socket which should contain the head of the bone is empty.
7. When rotated the bone does not move as one piece.	7. When rotated the bone moves as one piece.

Principles in treatment of fractures: Reduce the fracture; retain it in position; treat any complication.

Kocher's method of reduction is: to flex the forearm, press the elbow to the side, rotate the arm outward. Bring the arm forward and upward to a right angle with the body, then rotate inward, while the elbow is brought down over the body so that the fingers sweep the opposite shoulder.

2. Nitrous oxide, ether, and chloroform. Nitrous oxide is contraindicated in long operations, where absolute muscular relaxation is needed, in vascular degeneration, and advanced heart disease.

The following contraindications for ether and chloroform are from Hare's *Practical Therapeutics:* "Ether should not be used by inhalation in bronchitis or acute nephritis, because of its irritant properties; in peritonitis or gastritis, because it is apt to induce vomiting; in aneurysm or in the presence of marked vascular atheroma, because it may rupture a blood-vessel by raising arterial pressure; nor in diabetes, lest it produce diabetic coma; and if anemia is present and an examination of the blood shows that the hemoglobin is below 50 per cent., the use of the drug should be avoided if possible.

"*Chloroform* is not to be used in cases of fatty heart or dilatation of the heart, in those with a known idiosyncrasy, nor in the so-called lymphatic persons with overgrowth of lymphoid tissues, as, for example, adenoids. In the latter case it is particularly apt to cause sudden death. In valvular disease of the heart chloroform may be used with caution, although ether is preferable. Given a case of valvular disease that must be subjected to operation, the chances are bettered with an anesthetic than without it, as the pain and mental shock are worse for the heart than is the anesthetic."

3. *Ligation of femoral artery at Scarpa's triangle: Line* from middle of Poupart's ligament to inner side of internal condyle. Flex the thigh, rotate it outward, and bend the knee; make incision four inches long in the line of the vessel, with its center at apex of Scarpa's triangle. Divide fascia, draw Sartorius outward, clear the sheath of the vessel and pass the ligature *from* the side of the vein.

Anastomosis after ligation of femoral artery at apex of Scarpa's triangle: (1) External circumflex; with muscular branches of femoral, anastomotica magna, superior articular of popliteal, and anterior tibial recurrent. (2) Perforating and terminal of profunda; with muscular branches of femoral, and muscular and superior articular branches of popliteal. (3) Comes nervi ischiadici; with perforating of profunda and articular of popliteal.

In amputation at middle third of leg, the anterior tibial, posterior tibial, and peroneal arteries require to be ligated.

4. *Wounds are classified* as:

I. Contused and open wounds.

II. Open wounds may be: Incised, lacerated, contused, punctured, gunshot, or poisoned; also penetrating and perforating.

III. Aseptic and septic.

Sources of wound infection: Air; water; patient's skin, hair, or clothing; hands of surgeon, assistants, or friends; instruments and dressings; solutions; insects.

In the *aseptic* treatment of wounds no chemicals are

used; in the *antiseptic* treatment, chemicals are used to destroy or inhibit the growth of micro-organism.

5. *Symptoms of cholecystitis:* Acute pain and tenderness in the right hypochondrium, fever, vomiting, and constipation from inflammatory obstruction of neighboring coils of intestine. Suppuration may follow, the abscess bursting into the peritoneal cavity, intestine, or on the surface. The inflammation may subside, and leave adhesions around the gall-bladder. In some cases the suppuration extends along the bile-ducts into the liver, producing fatal suppurative cholangitis.

If the cystic duct is blocked there is severe pain, but no jaundice, and the gall-bladder is usually distended with mucus. If the impaction is at the junction of the common and hepatic ducts, there is intense jaundice, and the liver is enlarged from engorgement with bile, but the gall-bladder is not necessarily distended. When the common duct is blocked there is intense jaundice, and the gall-bladder is usually distended. A stone impacted in the lower end of the duct may ulcerate into the duodenum; higher up it may ulcerate into the colon or into the peritoneal cavity, producing peritonitis, or into the retro-peritoneal tissues, producing an abscess.

Treatment is cholecystenterostomy.

Intussusception is a form of intestinal obstruction due to the invagination of one segment of the intestine into another section. *Volvulus* is a twisting or kinking of the intestine.

6. *Hernia* is a protrusion of a viscus through an opening in the wall of the cavity in which it is contained.

Varieties of abdominal hernia: Inguinal, femoral, umbilical, ventral.

Hydrocele is a collection of serous fluid in the tunica vaginalis of the testicle.

The hydrocele is translucent and does not give an impulse on coughing; it is terse. The *scrotal hernia* feels doughy, is not translucent, and may give an impulse on coughing.

"Many operations are practised, but Bassini's is the most useful. An incision, 2½ inches long is made over the inguinal canal, exposing the structures of the cord and the external oblique. The external oblique fibers are split from the apex of the external ring to expose the canal. The sac is found, opened, emptied of its contents, and isolated from the structures of the cord up to the internal ring. If the hernia is irreducible, the intestine is freed and returned to the abdomen, omentum being ligatured and removed. The neck of the sac is then transfixed and tied with silk, and the fundus removed. The stump returns to the abdomen, three or four stitches are then passed

through the conjoined tendon and arched fibers of the internal oblique and transversalis muscles above, and the deep part of Poupart's ligament below. These are tied behind the cord. The external oblique is then sutured in front of the cord, leaving just sufficient opening for it to pass through without pressure. The skin is then closed by a continuous stitch. The patient should be kept in bed for three weeks, and should not exert himself for at least six weeks. If the wound has suppurated, or if the case is one in which the abdominal muscles are weak, it is advisable that a light truss should be worn afterwards for six months." (From *Aids to Surgery.*)

7.

CONCUSSION OF THE BRAIN.	COMPRESSION OF THE BRAIN.
Unconsciousness is incomplete; patient can be made to answer, though it may be briefly and in simple words.	Complete unconsciousness; may scream into patient's ear at the top of the voice, but will receive no answer.
Special senses, though greatly blunted, are not abolished.	Special senses entirely suspended.
Power of movement not destroyed; if the position of a limb be changed the patient will resist or bring it immediately into the original position.	Complete or partial paralysis; in most cases hemiplegia.
Respiration is quiet and feeble.	Respiration full and noisy.
Pulse feeble, frequent, and intermittent.	Pulse full and slow, and sometimes laboring.
The stomach sickens and rejects its contents.	The stomach is insensible to any impression; no nausea or vomiting.
The feces may be discharged incontinently, as may also the urine, though not usually.	Bowels are torpid, and the bladder incapable of emptying itself, though the urine may escape by overflow.
Deglutition little impaired.	Deglutition difficult or impossible.
Pupils variable, though generally contracted; the eyelids somewhat open.	Pupils variable, though generally much dilated, and the eyelids closed.
Temperature of the body less than natural.	Temperature almost natural, a little below the normal standard.

—(From Treves' *Manual of Surgery.*)

Classification of burns: First degree, reddening of the skin. *Second degree,* blistering. *Third degree,* destruction of the epidermis, Malpighian layer, and papillæ of the derma. The sensitive nerve terminals are exposed; consequently this is the most painful degree. The sweat and sebaceous glands and hair follicles are not destroyed, and from these epithelium spreads in healing, so that repair is rapid, and the scar is not a contracting one. *Fourth degree,* the whole thickness of skin and part of the subcutaneous tissues are destroyed. *Fifth degree,* the muscles are injured. *Sixth degree,* the whole limb is charred.

Constitutional effects: Shock, congestion of internal organs, fever, sepsis.

Treatment.—General: If carbonic-oxide poisoning is present, artificial respiration and administration of oxygen. For shock, opium and stimulants. Local: For burns of the first degree, powder with boracic acid. Puncture blisters, and cover the part with an antiseptic dressing. Burns of deeper degrees than the second must be made aseptic with 1 in 1,000 perchloride of mercury. Carbolic acid is absorbed readily, and must not be used. Antiseptic gauze dressings should then be used. Picric acid (20 grains to 1 ounce of water) is used as a dressing. It lessens the pain, and can be left on two or three days. The continuous bath may be used. If the burn be of any size, it should be skin-grafted, as the scars of burns contract very much, and may produce deformities. (*Aids to Surgery.*)

8. A *tumor* is a pathological new growth which tends to persist independently of the structures in which it lies, and which performs no physiological function.

Tumors are classified as follows:

I. Those derived from mesoblast:
   (*a*) *Benign:* Lipoma, fibroma, chondroma, osteoma, myxoma, myoma, neuroma, glioma, angioma, lymphangioma.
   (*b*) *Malignant:* Sarcoma.

II. Those derived from epiblast or hypoblast:
   (*a*) *Benign:* Adenoma, papilloma.
   (*b*) *Malignant:* Carcinoma.

III. Cystic tumors.

IV. Teratomata.

9.

CHANCRE.	CHANCROID
First lesion of a constitutional disease, viz., syphilis.	A local disease.
Due to syphilitic infection.	Due to contact with secretion from chancroid.

CHANCRE.	CHANCROID.
Generally a venereal infection.	Always a venereal infection.
May occur anywhere on the body.	Nearly always on genitals.
Period of incubation never so short as ten days.	Period of incubation always less than ten days (generally about three).
Generally single.	Generally multiple.
Not autoinoculable.	Autoinoculable.
Secretion slight.	Secretion profuse and purulent.
Slightly or not at all painful.	Generally painful.
As a rule only occurs once in any patient.	May reoccur in same patient.
Buboes are painless and seldom suppurate.	Buboes are painful and usually suppurate.

Treatment of chancres: Cleanliness, application of lotio nigra or iodoform, internal administration of mercury. Of *chancroid:* Cleanliness, application of lotio nigra, attention to the prepuce and to buboes.

10. *Fistula in ano.* There are four varieties: (1) The *complete,* which opens into the rectum internally and on the perineum externally; (2) the *external incomplete,* or *blind external,* which opens on the perineum but not into the rectum; (3) the *internal incomplete* or *blind internal,* which opens into the rectum but not on the perineum; (4) the *horseshoe* fistula, which extends around the rectum and opens on each side. The internal opening is generally between the two sphincters, but may be above the internal sphincter and below the external sphincter. There may be several pockets or side tracts extending in different directions.

Treatment consists in operation. "The field of operation should be shaved and thoroughly cleansed prior to the operation, and the patient should be anesthetized. The sphincter of the anus is gradually dilated. A grooved director is passed along the fistulous tract until its point is felt by the finger introduced in the bowel; it is then hooked forward and brought out through the anus; all the structures raised on the director are then divided, together with all sinuses and communicating pockets. The sphincter is divided in only one place. In women the sphincter is not divided. The wound is thoroughly cleansed and disinfected, and packed with gauze to allow to heal from the bottom. The bowels are not allowed to move for 3 to 4 days. The wound is dressed antiseptically every day."

Operation for internal hemorrhoids: The application of

a ligature is the operation most often performed. The patient is placed in the Sims position, and after the field of operation has been rendered aseptic, the sphincter is divided. The rectum is irrigated with a mercuric chlorid solution, 1:5000. A needle carrying a ligature is passed through the base of the tumor. The thread is cut and the ligature is firmly tied on each side. At least two-thirds of the pile should be excised by the scissors. Iodoform gauze is inserted, and a T-bandage is applied. Morphin (gr. ¼) is then given. The bowels should be moved on the third day. (*Pocket Cyclopedia.*)

Ischio-rectal abscess. Symptoms: Severe and throbbing pain in perineum and round anus, great tenderness, edema, redness of skin, fever, and signs of pus formation.

Treatment. Free incision, opening up every part of the abscess; do not wait for fluctuation. Irrigate and drain.

STATE BOARD EXAMINATION QUESTIONS.

Illinois State Board of Health Physicians' Examination.

ANATOMY.

1. Give the articulations of the inferior turbinate bone.
2. Where are the medulla oblongata, the pons Varolii and the cerebellum located, and how are they separated from the cerebral hemispheres?
3. Name the nerves that supply the muscles of the forearm and hand.
4. Where does the internal carotid artery commence? Where does it terminate and into what does it divide?
5. In tapping the pericardium, where should the puncture be made in order to avoid the pleura?
6. What bones form the articular surface of the knee-joint? Name the ligaments of the knee-joint.
7. Name the tunics, or coats, of the eye, from without inward; also the refracting media, or humors, of the eye.
8. Name the branches of (*a*) the ascending aorta; (*b*) arch of the aorta.
9. Give origin, insertion, action and nerve supply of the brachialis anticus muscle.
10. Where does the right lymphatic duct empty its contents? What prevents regurgitation of blood into these ducts?

PHYSIOLOGY.

1. Name the structures entering into the formation of a joint. What is meant by diarthrosis, amphiarthrosis, and synarthrosis? Give example of each.
2. What is meant by Wallerian degeneration?

3. State the estimated quantity of the secretion of the following body juices and fluids in twenty-four hours: saliva, gastric juice, pancreatic juice, bile, and urine. State chemical reaction of each.

4. State the various changes which a fat and carbohydrate food undergoes after being taken into the mouth until reaching the circulation. Where do they enter the circulation?

5. State the rate of respiration per minute in a child one year old. Give the vital capacity of the adult lung.

6. Define eupnea, hyperpnea, apnea, dyspnea and asphyxia.

7. Name and describe the three orders of levers found in the human body. Give example of each.

NEUROLOGY.

1. Define pachymeningitis, leptomeningitis and syringomyelia.

2. Give diagnostic difference between catalepsy and epilepsy.

3. Give diagnostic difference between paralysis agitans and locomotor ataxia.

CHEMISTRY.

1. What important compound does carbon form with nitrogen and oxygen? Give formula of compound.

2. Give the formula of chlorate, bromate and iodide of sodium.

3. What do the following symbols represent: NH_3, NH_4Cl, N_2O, $NaHSO_4$?

4. Name the principal oxygen derivatives of the hydrocarbons.

5. How would you proceed to examine substances for arsenic?

ETIOLOGY AND HYGIENE.

1. What is the etiology of bronchopneumonia?

2. Give the etiology of chronic endocarditis.

3. What is the etiology of diabetes insipidus?

4. How may milk become a factor in the causation of disease or become a disease carrier? What means would you recommend to prevent the transmission of disease by milk?

5. What hygienic measures would you recommend to prevent or diminish the severity of cholera infantum?

MATERIA MEDICA AND THERAPEUTICS.

1. Name several of the solvents commonly used in the preparation of drugs, and give advantage of each. What are the objections, if any, to mixing alcoholic with aqueous solutions? Give examples.

2. Give names and general physiological actions of one or more of the convulsant series of drugs, with dose and use.

3. Name five alkaloids. What are some advantages of the employment of alkaloids? Give doses of three and the action and use of one.

4. Give dose, action, and use (local and internal) of atropin sulph. Why is atropin combined with morphine in hypodermic tablets?

5. Give classification, action, dose, dangers, and indications for use of pilocarpin.

6. Give physiological action, contraindications, dose, and use of preparations of thyroid gland.

7. Give dose, action, uses, and dangers of phenyl salicylate.

8. Name two general anesthetics. Give action, uses, and dangers of one of them.

9. Give the action, dose, dangers, uses, and contraindications of digitalis.

10. Give the action and use of one of the preparations of calcium used in medicine.

PATHOLOGY.

1. Give the pathology of ophthalmia neonatorum.

2. Define cyanosis, and give the pathological cause.

3. What is an atheromatous degeneration? Give pathology.

4. What are the pathological changes in a chronic enteritis?

5. Describe metastatic abscess formation.

BACTERIOLOGY.

1. Give methods of staining gonococci. Describe their appearance.

2. What is tuberculin? Describe the general reaction following the use of tuberculin.

3. What are the bacterial findings in puerperal septicemia?

4. Name and describe the microorganism of Asiatic cholera.

5. What microorganisms are most frequently related etiologically to the development of surgical septicemia?

PRACTICE OF MEDICINE.

1. Given a moderate regurgitation at the aortic orifice of two years' duration, this being the only valvular lesion present, describe the necessary concurrent physical signs and give the treatment.

2. Differentiate between reflex, gastric, and cerebral vomiting, and outline the treatment of gastric vomiting.

3. Name the principal complications of diabetes, and give the treatment of each.
4. Differentiate encephalic tumor from abscess of the brain.
5. Describe (a) circulatory, (b) urinary findings in a case of chronic contracting nephritis, and give prognosis and dietetic management.
6. Give the symptoms and treatment of epidemic influenza.
7. Distinguish cystitis from pyelitis, and give treatment of the latter.
8. What acute infections are liable to cause inflammation of the endocardium? How would you treat one of them?
9. Give the diagnosis of tuberculous cystitis, the treatment and prognosis.
10. What diseases are usually associated with the following: Corrigan pulse, hematemesis, hemoptysis, jaundice, dropsy of lower extremities, crepitant râles, high blood pressure, increased frequency of pulse without fever, cyanosis, vesicular breathing. (Name the disease or diseases separately for each of the above symptoms or conditions.)

OBSTETRICS.

1. What changes occur in the uterine appendages during pregnancy?
2. What are the probable signs of multiple pregnancy?
3. What are the symptoms of polyhydramniosa
4. How are abortions usually classified? What are the symptoms of inevitable abortion?
5. Discuss concealed hemorrhage.
6. Outline treatment of puerperal eclampsia.
7. Discuss the diagnosis of presentations.
8. Give treatment in case of prolapsed cord.
9. What are the symptoms of acute inversion of the uterus?
10. Discuss the methods of performing version.

SURGERY.

1. Name the surgical diseases of the mammary gland and outline treatment of the same.
2. Make a diagram of the regional anatomy of the abdomen, and name the vital organs located in the epigastric region.
3. Classify wounds, and describe the variety most commonly infected, and give manner of infection.
4. Outline the management of a case of erysipelas.
5. Give symptoms and diagnosis of cerebral concussion.
6. Describe four varieties of gastric ulcers. Give occurrence of each.

7. Give indications for aspiration of urinary bladder, and describe the operation.
8. Give the pathology of gummata, and outline surgery of same.
9. Classify the different varieties of ankylosis, and give pathology of one variety.
10. Name the congenital deformities of the spine.

PHYSICAL DIAGNOSIS.

1. Describe in detail an examination of the urinary bladder.
2. What are the physical signs of incipient pulmonary tuberculosis?
3. Differentiate regurgitation at the aortic valve and at the mitral valve.
4. What are the signs by which one recognizes fluid in the peritoneal cavity?
5. Enumerate the signs of obstruction of the portal vein.
6. What are the physical signs of lobar pneumonia?

OPHTHALMOLOGY AND OTOLOGY.

1. Give the time of appearance and diagnosis of presbyopia ophthalmia.
2. Discuss the etiology and sequelæ of otitis media.

PEDIATRICS.

1. Give symptomatology and diagnosis of marasmus.
2. What is modified milk? Give schedule for feeding from birth.

GYNECOLOGY.

1. Give the causes, physical signs and treatment of pelvic peritonitis.
2. Give the diagnosis, prognosis, and treatment of uterine fibroids.
3. Name the varieties of ovarian cysts and describe each.
4. Which route is to be selected in the operation of cystotomy in the female? Give the technique of operation.
5. Describe the operation of trachelorrhaphy.
6. What is vaginismus? Give etiology and treatment.

LARYNGOLOGY.

1. Describe method of intubation of the larynx.

RHINOLOGY.

1. Mention two varieties of nasal polypi. Give symptoms and treatment.

MEDICAL JURISPRUDENCE.

1. What are the most common accidental forms of death in the new born.
2. Differentiate between burns inflicted during life and those inflicted after death.

ILLINOIS.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

ILLINOIS STATE BOARD OF HEALTH PHYSICIANS' EXAMINATION.

ANATOMY.

1. The *inferior turbinated bone articulates with* the ethmoid, superior maxillary, lacrymal, and palate bones.

2. The *medulla* extends from the foramen magnum to the lower border of the pons varolii.

The *pons varolii* is at the base of the brain, between the medulla and crura cerebri; in front of the cerebellum.

The *cerebellum* is behind the pons and medulla and below the hinder portion of the cerebral hemispheres.

All these structures are in the posterior cranial fossa, and they are separated from the cerebral hemispheres (which are above them) by the tentorium cerebelli.

3. The *nerves which supply the muscles of the forearm and hand* are: The median, ulnar, musculospiral, and posterior interosseous.

4. The *internal carotid artery commences* at the bifurcation of the common carotid, opposite the upper border of the thyroid cartilage; it *terminates* in the middle fossa of the cranium, near the beginning of the Sylvian fissure; it *divides into* the middle cerebral and anterior cerebral arteries.

5. In *tapping the pericardium* the puncture should be made in the fifth or sixth left intercostal space, near to the edge of the sternum. If the pericardial sac is much distended the puncture may safely be made one inch external to the border of the sternum; this will be external to the internal mammary vessels. In both cases the pleura will be avoided.

6. The *articular surface of the knee joint* is formed by the femur, tibia, and patella. The *ligaments* are: Capsular, anterior, posterior, internal lateral, two external lateral, anterior or external crucial, posterior or internal crucial, transverse, coronary, and two semilunar fibrocartilages.

7. The *tunics or coats of the eye,* from without inward, are: (1) The cornea and sclerotic; (2) choroid, ciliary body, and iris; and (3) the retina.

The *refracting media* are: The aqueous humor, the crystalline lens, and the vitreous body.

8. *Branches of the ascending aorta:* Right coronary and left coronary arteries.

Branches of the arch of the aorta: Innominate, left common carotid, and left subclavian arteries.

9. BRACHIALIS ANTICUS. *Origin:* Lower two-thirds of

anterior surface of shaft of humerus, and from intermuscular septa. *Insertion:* Inferior surface of coronoid process and adjacent surface of shaft of ulna, and into anterior ligament of elbow joint. *Action:* Flexor of forearm. *Nerve supply:* Musculospiral and musculocutaneous.

10. The right lymphatic duct empties its contents into the right subclavian vein at its angle of junction with the right internal jugular vein. Regurgitation of blood into the duct is prevented by two semilunar valves which guard its orifice.

PHYSIOLOGY.

1. *Structures entering into the formation of a joint:* The articular ends of two or more bones, cartilage, fibrocartilage, ligament. and synovial membrane.

Diarthrosis is a freely movable joint, as the knee.

Amphiarthrosis is a slightly movable joint, as the inferior tibio-fibular articulation.

Synarthrosis is an immovable joint, as that between the sphenoid and vomer.

2. *Wallerian degeneration:* "When a nerve is divided the first result is a loss of its function. Inasmuch as each nerve-fiber develops from a cell which later nourishes it, if the connection between the two is severed the nerve-fiber undergoes Wallerian degeneration, and in the case of a nerve which is made up of nerve-fibers the whole nerve undergoes this change. This degeneration consists, in the case of medullated nerves, in the death of the axis-cylinder, the breaking up of the medullary sheath into drops of myelin, which are later absorbed, and the multiplication of the nuclei of the primitive sheath. In non-medullated nerves the only result is the death of the axis-cylinder. Degeneration begins very soon after the section —within a day or two—and throughout the entire severed portion of the nerve at the same time. Thus the course of a nerve, or a collection of nerves, may be traced throughout its entire extent. These changes are believed to be due to the severance of the nerve from its trophic center. If an anterior root of a spinal nerve is divided, the distal end, being separated from the gray matter of the cord, which is its center of nutrition, undergoes degeneration, while the end which remains connected with the cord retains its integrity. If a posterior root is divided between the cord and the ganglion the degeneration takes place between the cord and the ganglion; while if divided below the ganglion the degeneration takes place in that portion separated from the ganglion, showing that the ganglion is the nutritive center for the posterior root."—(Raymond's *Physiology.*)

3.

	CHEMICAL REACTION.	AMOUNT SECRETED IN 24 HOURS.
Saliva	Alkaline.	About 2½ pounds.
Gastric juice.....	Acid.	About 10 or 12 pounds.
Pancreatic juice.....	Alkaline.	About 1½ pounds.
Bile	Alkaline.	About 2½ pounds.
Urine	Acid.	About 40 to 50 ounces.

4. *Fats* are not digested in the mouth or stomach; in the small intestine they are acted upon by the steapsin of the pancreatic juice and by the bile. These two agents cause the fats to be emulsified and saponified. The fats are absorbed by the villi, and are conveyed to the circulation by means of the thoracic duct, which enters the venous circulation at the junction of the left subclavian and internal jugular veins.

Carbohydrates: The saliva (by its ptyalin) changes starches into dextrin and sugar; the stomach does not aid in the digestion of carbohydrates; in the small intestine the amylopsin of the pancreatic juice changes starches into dextrins and sugar, and the invertin of the succus entericus changes cane sugar into invert sugar. Carbohydrates are absorbed in the small intestine and converted by the portal vein to the liver, and thence by the hepatic vein to the ascending vena cava.

5. A child one year old respires about thirty times a minute. The vital capacity of the adult lung is about 230 cubic inches.

6. *Eupnea* is the condition in which respiratory action is easy or normal. *Hyperpnea* means exaggerated respiratory action. *Apnea* means cessation of respiratory action. *Dyspnea* means difficulty in breathing. *Asphyxia* is unconsciousness due to interference with the oxygenation of the blood.

7. Levers of the *first order* have the fulcrum between the weight or resistance and the power or moving force; the skull, in its movements backward and forward on the atlas, is an example. Levers of the *second order* have the weight between the fulcrum and the power; as in depression of the lower jaw. Levers of the *third order* have the power between the fulcrum and the weight; as in flexion of the forearm.

NEUROLOGY.

1. *Pachymeningitis* is inflammation of the dura mater. *Leptomeningitis* is inflammation of the arachnoid and pia mater. *Syringomyelia* is a condition characterized by the presence of cavities in the substance of the spinal cord.

2. In *catalepsy* there is loss of will, muscular rigidity,

generally loss of consciousness, and it is often associated with hysteria.

Epilepsy is diagnosed by the aura, the sudden onset, the cry, the sudden loss of consciousness, the tonic convulsion, the biting of the tongue, the dilated pupils, and the urinary incontinence. In *hysteria* the patients do not generally hurt themselves.

3. In *paralysis agitans* there are tremors, progressive loss of power in the affected muscles, moderate rigidity, alteration in gait (propulsion), and mental impairment.

In *locomotor ataxia,* there are loss of co-ordination, neuralgic pains in the limbs, loss of sensation and reflexes, inability to stand still with the feet close together and the eyes closed.

CHEMISTRY.

1. Urea; CON_2H_4.

2. Sodium chlorate, $NaClO_3$; sodium bromate, $NaBrO_3$; sodium iodide, NaI.

3. NH_3, ammonia; NH_4Cl, ammonium chloride; N_2O, nitrogen monoxide; $NaHSO_4$, monosodic sulphate.

4. Alcohols, aldehydes, acids, ethers, ketones.

5. *Test for arsenic:* Reinsch's test is as follows: To the suspected fluid add a little pure HCl; suspend in the fluid a small strip of bright copper foil, and boil. If a deposit forms on the copper, remove the copper, wash it with pure water, dry on filter paper, but be careful not to rub off the deposit. Coil up the copper, and put it into a clean, dry glass tube, open at both ends, apply heat at the part where the copper is. If arsenic is present there will appear in the cold part of the tube a mirror, which will be found on microscopical examination to consist of octahedral crystals of arsenic trioxide.

ETIOLOGY AND HYGIENE.

1. *Etiology of bronchopneumonia:* Probably an infection, but specific organism not yet determined; mixed infection generally; commonest in infants and old people; follows bronchitis, measles, diphtheria, scarlet fever, whooping cough, asthma, emphysema, tuberculosis.

2. *Etiology of chronic endocarditis:* Acute endocarditis, acute articular rheumatism, syphilis, nephritis, gout, alcoholism, excessive exercise and strain.

3. *Etiology of diabetes insipidus:* Unknown; supposed to be of nervous origin, or from malnutrition or syphilis; it has been attributed to vasomotor disturbance of the kidneys; it sometimes follows infectious diseases.

4. The milk may come from a diseased cow; it may become contaminated by the milker, the container, the surroundings, the water used to wash the cans or to adulterate the milk; or it may become contaminated at the

dealer's or purchaser's house by being left uncovered, exposed to flies, etc., or by not being kept in a cool place. The only way to prevent the transmission of disease by milk is to insist on a thorough inspection of all dairies and sources of milk supply, and to educate the public in the care of milk between the time of its purchase and its consumption. The inspection should include: the color, reaction, specific gravity, sediment, taste, odor, acidity, total quantity of solids and of water; the percentage of cream, fats, lactose, casein and ash; the presence or absence of preservatives, coloring matter, added solids, dilution, pathogenic microorganism, dirt or other foreign matter. There should also be thorough investigation as to its source, the cows and their environment, the method employed in caring for, milking, storing, and transporting the milk.

5. Encourage breast-feeding; for artificially fed infants, see to the source and purity of the milk, cleanliness of feeding bottles and nipples; do not let the child eat improper food, such as unripe fruit; allow plenty of fresh air and sunshine.

MATERIA MEDICA AND THERAPEUTICS.

1. *Solvents used in pharmacy:* Water, alcohol, glycerin. ether, chloroform, benzine, carbon disulphide, oils, and acids. *Alcohol:* Solutions in alcohol will keep almost indefinitely; gums, albumins, and starch are insoluble in alcohol. *Glycerin:* If concentrated, glycerin is antiseptic. *Ether* is a good solvent for resins, fats, oils, and some alkaloids and neutral principles. *Chloroform* is not inflammable. *Carbon disulphide* is a good solvent for rubber and phosphorus. *Oils* are used in making liniments.

2. *Strychnine* is a convulsant. *Action:* Strychnine is a bitter tonic, stimulates appetite, secretion, and digestion, increases peristalsis, stimulates the vasomotor centers, and so raises arterial tension; it stimulates both accelerator and inhibitory nerves of the heart. All the functions of the spinal cord are exalted by strychnine, reflex, motor, vasomotor, and sensory. Large doses cause dilated pupils, irregular and jerky respiration, increased reflexes. *Therapeutic uses:* For indigestion, intestinal torpor, heart disease, pneumonia, amenorrhea, dysmenorrhea, paralysis, impotence, and as a cardiac and respiratory stimulant. *Dose:* Strychnine sulphate, one-sixty-fourth of a grain; strychnine nitrate, one-sixty-fourth of a grain.

3. *Five alkaloids:* Quinine, atropine, aconitine, cocaine, and strychnine. *The alleged advantages of the employment of alkaloids* are: Prompt action, accurate dosage, no inert or foreign matter is given which may mask the action of the drug, and there are no nauseating doses for

the patient to take. *Doses of three:* Aconitine, gr. 1/400; atropine sulphate, gr. 1/160; morphine sulphate, gr. 1/6. For action and use of strychnine see QUESTION 2.

4. ATROPINE: *Dose,* gr. 1/160.

Action: Anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood pressure, but toxic doses cause the blood pressure to fall, stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

Therapeutic indications: For the relief of pain, to dilate the pupil, to check secretions, for diarrhea, for asthma, for shock and collapse, for colic of all kinds, for delirium, for epilepsy, chorea and migraine, for paralysis, for cough, in constipation, in chorea, spermatorrhea, or cystitis.

Atropine is often combined with morphine when the latter is used, for the following reasons: (1) To prevent nausea and insomnia; (2) to intensify the effect of the morphine, and so a smaller dose may suffice; (3) to neutralize the effect on the pupils.

5. PILOCARPINE is *classified* as a diaphoretic. *Action:* It causes increase of saliva and of perspiration; increased peristalsis; it increases and then diminishes blood pressure and heart action; it causes the pupil to contract and depresses the nervous system. *Dose:* gr. 1/5 of the hydrochloride. *Dangers:* Marked cardiac and respiratory depression, nausea, vomiting, and collapse. *Indications for use:* Bright's disease, uremia, eclampsia, pleural effusion, dropsy, and whenever prompt diaphoresis is required.

6. THYROID GLAND. *Action:* "It is a powerful vasomotor dilator, causing flushing of the cutaneous surface; large doses are apt to produce loss of appetite and diarrhea; it stimulates the cerebrum, and, given to excess, produces headache, restlessness, insomnia, palpitations, hot flashes, sweating, tremors, and even convulsions; it is excreted by the kidneys, and the quantity of urine is uniformly increased by it; it induces a greatly increased oxidation in the system. *Uses:* Myxedema; goiter (especially the hyperplastic follicular variety); sporadic cretinism; arteriosclerosis; delayed menstruation."—(Wilcox's *Materia Medica.*) *Dose:* 4 grains. *Contraindications:* Diabetes mellitus and in great emaciation.

7. PHENYL SALICYLATE. *Dose:* 7½ grains. *Action:* antiseptic, germicidal, anodyne, and antipyretic; it combines, in most respects, the actions of phenol and salicylic acid. *Uses:* As a disinfectant, in inflammation of the mouth and pharynx, in cystitis, as an intestinal antiseptic in typhoid fever, in muscular rheumatism, in intestinal indigestion and fermentation, in cholera. *Dangers:* In the small intestine it is decomposed into salicylic acid and

carbolic acid, and symptoms of carbolic acid poisoning may develop.

8. Chloroform and ether.

CHLOROFORM. *Action:* Externally it is an irritant and a vesicant. Internally it acts like alcohol, is a stomachic and cardiac stimulant. It is a general anesthetic. *Uses:* For chroric rheumatism, neuralgia, and inflammation and as a general anesthetic. *Dangers:* Chloroform is not to be used in cases of fatty heart or dilatation of the heart, in those with a known idiosyncrasy, nor in the so-called lymphatic persons with overgrowth of lymphoid tissues, as, for example, adenoids. In the latter case it is particularly apt to cause sudden death. In valvular disease of the heart chloroform may be used with caution, although ether is preferable. Given a case of valvular disease that must be subjected to operation, the chances are bettered with an anesthetic than without it, as the pain and mental shock are worse for the heart than is the anesthetic.

9. DIGITALIS. *Physiological action:* It is a gastro-intestinal irritant, it slows the rate of the heart, prolongs diastole, increases the force of the heart, it contracts the blood-vessels, and causes a rise in blood pressure, it also acts as a diuretic. *Therapeutic use:* Digitalis is indicated in diseases of the heart: (1) when the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in non-valvular cardiac affections: (4) in irritable heart, due to nerve exhaustion. Digitalis is *contraindicated* in diseases of the heart: (1) in aortic lesions when uncombined with mitral lesions; (2) when the heart action is strong, and arterial tension high. Digitalis is also a diuretic; and it is also used in some forms of nephritis, exophthalmic goiter, pneumonia, chronic bronchitis, etc. *Dangers: Overdose or constant use* will cause irregularity of the heart, headache, vomiting; and hobbling dicrotic pulse, particularly when the patient changes from the recumbent to a sitting posture. *Dose:* Of the tincture, 15 minims.

10. CALCIUM PHOSPHATE. *Action:* It is supposed to build up the solid tissues of the body, and to give them proper consistence and solidity. *Uses:* It is given in rickets, tuberculosis, scrofula, mollities ossium, anemia, syphilis, and neurasthenia.

PATHOLOGY.

1. *Ophthalmia neonatorum.* The conjunctiva becomes congested, the lids edematous and swollen: infiltration is present on the conjunctiva, pus is present and usually the gonococcus.

2. *Cyanosis* is a bluish discoloration of the skin due to non-oxidation of the blood. It is caused by local or gen-

eral circulatory disease; heart disease, emphysema, pneumonia, and asthma.

3. *Atheromatous degeneration* is the degenerative process, involving the intima in cases of arteriosclerosis. Under the intima are found patches of soft, semi-fluid material, covered by an imperfect layer of endothelium. This covering breaks away leaving an atheromatous ulcer; this latter sometimes becomes calcified, forming atheromatous plates.

4. *Chronic enteritis* may follow the acute form or it may depend upon the persistence of the cause of irritation. It generally involves the small intestine and upper part of the large. The mucosa is thickened, even to the extent of polypoid formations, the lymph-follicles enlarged, and extensive connective tissue hyperplasia is present. In between the elevated areas of mucosa there are depressed bands of fibrous tissue. The surface of the intestine is covered by a tenacious mucus and the color of the tissue may be very dark on account of the venous congestion. Round-cell infiltration is marked. Instead of hypertrophy there may be an atrophy of the glandular tissue, on account of the contraction of the fibrous tissue. These areas will be marked by the presence of dark almost black pigment. there is generally an atrophy of the muscularis as well. —(McConnell's *Pathology.*)

5. A metastatic abscess is formed by an infected embolism carrying the infective material to another place, by the blood current.

BACTERIOLOGY.

1. The *Gonococcus* is a diplococcus with a special predilection for the mucous membrane of the urethra and vagina. It is sometimes found on the conjunctiva. The appearance is that of two coffee beans; the gonococcus is found in the pus cells, stains with ordinary anilin dyes, but not by Gram's method. It is aërobic, and can be cultivated on human blood serum; it will not grow on gelatin, agar, bouillon, or potato. It was discovered by Neisser.

To demonstrate *gonococci:* On a cover-glass make a smear with the discharge as thin as possible, and let it dry in the air; cover it with a freshly made solution of anilin-oil-gentian-violet for one or two minutes; wash it in distilled water; leave it in Gram's solution for two minutes; wash it in 95 per cent. alcohol until decolorized; wash it in distilled water; counterstain with a dilute carbolfuchsin without heat, or with a saturated agueous solution of Bismarck brown; wash in distilled water, dry with filter paper, mount, and examine with an oil-immersion lens. The gonococci will appear as *diplococci within the leucocytes,* which have been *decolorized by Gram's stain,* and have taken the counterstain.

2. *Tuberculin* is a glycerin extract of cultures of the bacillus of tuberculosis. It is used as a means of diagnosis and treatment of tuberculosis.

Tuberculin in the Calmette's ophthalmo-reaction, is instilled into the eye, in a one per cent. solution. A positive reaction shows a hyperemia of the conjunctiva in from twelve to twenty-four hours. It is uncertain and unsafe.

3. In *puerperal septicemia*, we may find: Streptococcus pyogenes, staphlococcus pyogenes (aureus and albus). bacillus coli, bacillus aerogenes capsulatus, gonococcus, typhoid bacillus, bacillus diphtheriæ.

4. *Microorganism of Asiatic cholera* is the spirillum choleræ, or spirochete of Koch. It is an actively motile body, resembling a comma or S. It is thicker and shorter than the tubercle bacillus; it has a few flagella at the ends. In the body it is anærobic; outside the body it is ærobic. It is stained by ordinary methods, but not by Gram's method.

5. *Streptococcus pyogenes, pneumococcus, Staphylococcus pyogenes,* and colon bacillus.

PRACTICE OF MEDICINE.

1. Cardiac impulse is strong, apex beat displaced, to left, vessels of neck throb or pulsate; pulse is distinctive (the Corrigan pulse), capillary pulsation can be seen under the finger-nails; percussion shows increased area of dullness; diastolic murmur can be heard at base of heart, in middle of sternum opposite third costal cartilage. Excessive physical exercise must be avoided; also irregular living; aconite or veratrum or digitalis may be needed; look after general health.

2.

CEREBRAL VOMITING.	GASTRIC VOMITING.
Little or no nausea, vomiting continues after stomach is emptied.	Nausea relieved by vomiting, returns when food is taken.
No tenderness on pressure over the liver or stomach.	Liver and stomach are tender, pressure produces inclination to vomit.
Pulse infrequent and hard.	Pulse frequent and weak.
Tongue clean, breath sweet, conjunctivæ normal or injected, headache primary.	Tongue furred, breath offensive, conjunctivæ often yellowish, headache secondary as to time.
Constipation generally obstinate.	Griping abdominal pain, diarrhea and clay-colored stools.
No salivation.	Increased salivation.

—(Potter.)

Reflex vomiting is found in pregnancy, uterine or ovarian disease, worms, irritation of the fauces.

3. *Chief complications* are: Boils, carbuncles, eczema, pruritus, pneumonia, coma, neuritis, impotence.

4.

TUMOR OF BRAIN.	ABSCESS OF BRAIN.
1. No primary focus of infection but often history of syphilis or malignant disease of other organs.	1. Suppurating area in ear, nose, pharynx, scalp, or lung abscess.
2. Very slow development.	2. More rapid.
3. More definite focal symptoms.	3. Focal symptoms often present, but not so definitely localized as in tumor.
4. No rigors or septic symptoms.	4. Often begins with chills, septic symptoms often continue.
5. Temperature normal or slightly and irregularly elevated.	5. Temperature subnormal, other times higher—pus temperature.
6. Pulse slow.	6. Not slow as a rule.
7. Constant headache.	7. Not a constant or prominent symptom.
8. Projectile vomiting frequently present.	8. Not often; vomiting, if present, more frequent and not projectile.
9. General symptoms of pressure progressive.	9. When present they vary greatly in intensity.
10. Choked disc constant.	10. Not constant.

—(Eisendrath's *Surgical Diagnosis.*)

5. Pulse is hard and incompressible, tension is increased, vessel wall generally thickened, blood pressure very high, heart is hypertrophied; polyuria, with low specific gravity, urine light in color, albumin slight or absent, a few hyaline or granular casts may be found, solids diminished. The disease is incurable; diet should be light and nourishing, meat only once a day, and excess is to be avoided.

6. *Influenza.* "The disease is characterized by chilliness, sneezing, nasal discharge, intense pains in the head, chest, and back, cold perspiration, cough, expectoration, prostration, sometimes nervous manifestations, and gastro-intestinal disturbances, elevation of temperature, and increase of pulse and respiratory rate. Croupous pneumonia, bronchopneumonia, nephritis, chronic bronchitis, and insanity may occur as complications. The prognosis is usually favorable, but should be guarded in the old and in the presence of complications.

Treatment: Absolute rest in bed and liquid diet should be prescribed. The administration of fractional doses of calomel (gr. 1/6 every hour for 6 doses) should begin the treatment. Phenacetin (gr. 5 every 3 or 4 hours), may be given for the fever and the pains. Quinin (gr. 4), sodium salicylate (gr. 7), or whisky (3 4) may be administered every 3 or 4 hours. The local application of menthol (gr. 1½) in liquid vaselin (ʒ 1) to the nasal mucous membrane is beneficial. Sulphonal (gr. 10) or trional (gr. 15) will relieve insomnia. Iron, quinin, and strychnin are indicated in the convalescence."—(*Pocket Cyclopedia.*)

7. *Cystitis.* The symptoms are frequency of urination, with vesical tenesmus, pain, and tenderness in the hypogastrium, fever, variable in degree, and scanty, highly colored urine containing mucus, blood, pus, and amorphous and triple phosphates.

Pyelitis is characterized by pain in the lumbar region, irregular fever, and urine containing pus cells, mucus, red blood corpuscles, pelvic epithelium, and sometimes blood clots. The *treatment* varies with the cause, but in any case, rest in bed, liquid diet, and the administration of saline purgatives and stimulating diuretics are of great service.

8. Rheumatism, tonsillitis, scarlet fever, smallpox, pneumonia; sometimes measles, chickenpox and diphtheria.

Treatment of tonsillitis: Rest in bed, fractional doses of calomel, sodium, salicylate, pellets of ice to suck, hot or cold compresses, light and nutritious diet.

9. *Tuberculous cystitis.* "The *symptoms* begin with apparently causeless and painless frequency of micturition. As the frequency increases, micturition becomes painful, and blood and pus are passed. Bacilli are found with the microscope, or demonstrated by inoculating a guinea-pig. Death results from exhaustion, extension to the kidney, phthisis, or general tuberculosis. *Treatment:* The general health must be treated by fresh air, good diet, and tonics. Irrigation with boracic lotion or weak iodoform emulsion relieves the symptoms. Morphia suppositories relieve the pain. Failing this, suprapubic drainage is necessary, and allows of local applications to the ulcers through a 'caisson' speculum. The ulcers may be scraped and painted with iodoform, or cauterized. As a rule, the best that can be hoped for in these cases is to relieve the pain and delay the course of the disease."—(*Aids to Surgery.*)

10. *Corrigan pulse* is usually associated with aortic regurgitation; *hematemesis,* with gastric ulcer or carcinoma, leukemia, splenomegaly, pernicious malarial fever, yellow fever, scurvy, chronic heart disease, and corrosive poisoning; *jaundice,* with yellow fever, Weil's disease, acute

yellow atrophy of liver, various poisons, gastroduodenitis, and catarrh, gallstones, or parasites in the bile ducts; *dropsy of lower extremities,* with cardiac dropsy, hepatic cirrhosis, abdominal tumors, or enlarged viscera; *crepitant râles,* with lobar pneumonia and hemorrhagic infaction of lung; *high blood pressure,* with chronic intestinal nephritis, gout, arteriosclerosis, uremia, and lead poisoning; *increased frequency of pulse without fever,* with exophthalmic goiter, endocarditis with loss of compensation, acute endocarditis, and pericarditis; *cyanosis,* with congenital heart disease, asthma, emphysema, stenosis of or foreign body in glottis, trachea or bronchi, croup, pneumonia, bronchopneumonia, and pleurisy with effusion; *vesicular breathing,* with consolidated or congested lung, and in many cases of dyspnea.

OBSTETRICS.

1. The uterus becomes larger in every way, is more vascular, first sinks and then rises; the cervix becomes more vascular, softer and edematous; later the cervix becomes shorter; vagina and vulva become hypertrophied, more vascular, discolored and secrete more freely; the vulva becomes more patulous.

2. *Multiple pregnancy* may be diagnosed by the following signs: (1) The abdomen may be irregular in shape and may show a sulcus indicating the space between the two fetal sacs; (2) persistent and increased tension of the uterine walls; (3) two fetal heart sounds may be heard; (4) multiplicity of small parts; (5) two fetal heads or backs may be palpated; (6) diminished fetal mobility. Sometimes it is difficult to diagnose the condition before the birth of one child.

3. *Symptoms of polyhydramnios:* Pain, distention of abdomen, slight rise of temperature, vomiting, orthopnea, dyspnea, depression, insomnia, sense of weight, edema.

4. *Abortions* are usually classified as: Abortion, miscarriage, and premature labor; also as: Threatened, inevitable, incomplete, and complete. *Symptoms of inevitable abortion:* Persistent hemorrhage, increasing in amount and containing clots and fragments of the ovum; pain, which progressively becomes more severe; discharge, which consists of blood, and portions of ovum; os is dilated; signs of pregnancy become arrested.

5. *Concealed hemorrhage* is one form of hemorrhage in premature detachment of the placenta. The blood dissects its way between the placenta and membranes, but does not escape externally (or only very slightly). Symptoms are pallor, syncope, thirst, rapid and weak pulse; the uterus is soft and enlarged. Prompt delivery is indicated, and the

woman should be stimulated with strychnine, ergot, and hypodermoclysis.

6. *Puerperal eclampsia. Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:* (1) Controlling the convulsions (by chloroform, veratrum, or chloral; (2) elimination of the poison or poisons which are presumed to cause the convulsions; (3) emptying the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

The danger signals of impending eclampsia are: Headache; tinnitus aurium; dizziness; pain over stomach; digestive, visual, and nervous disturbances; general debility, insomnia, vomiting, and vertigo.

7. *Diagnosis of presentations.* "The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contrasting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and, to confirm this fact, the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the hand, and changing their position from time to time. Having located the back and the extremities, the portion of the fetal ellipse presenting at the superior strait is next ascertained. The examiner now faces the woman's feet and, with the outstretched hands, the fingers parallel with and the middle finger over the center of Poupart's ligament into the pelvic cavity. If the head is presenting, it is felt as a hard, regular, round body, the greater mass of the occiput, the sharp point of the chin, and the groove between occiput and back being distinguishable. At the same time, the density of the head, its compressibility, its approximate size, and its relative size to the pelvis may be learned." —(Hirst's *Obstetrics.*)

8. *Treatment of prolapsed cord* consists in: (1) Not rupturing the membranes prematurely, unless there is some

positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually, or with some form of repositor; (4) speedy delivery, by forceps or podalic version.

9. *Symptoms of acute inversion of the uterus* are: Acute pain, hemorrhage, weak and rapid pulse, cold extremities, collapse, pallor nausea, anxious expression, and shock.

10. *Internal version.* "(1) The patient lying on her back with hips at the edge of the bed, the hand is cautiously passed into the uterus until a foot is reached and seized. As this foot is pulled down, the child is turned until the breech presents. While this is being done, the other hand makes counter-pressure externally upon the fundus. According to some, version will be easier if we seize the foot which is furthest from us. (2) The head may be seized and brought down in some cases."

External version. "(1) By careful palpation we ascertain the exact position of the head and breech. (2) One hand placed over the head (on the abdomen) and the other over the breech, push the head and breech in opposite directions until one or the other is brought into the pelvic inlet. This is rarely practicable after the liquor amnii is evacuated."

Bipolar version. "(1) One hand is introduced into the vagina, and two fingers made to press against the presenting part. (2) The other hand is applied on the abdomen and pressed against the head or breech of the child, while the fingers of the other hand press the presenting part upward and to one side or the other. The hand introduced into the vagina should be the same in name as the side of the pelvis toward which the fetal feet are directed. As soon as the presenting part is brought down, the membranes should be ruptured while a uterine contraction is in progress. The strictest asepsis must be used. This is also known as Braxton Hicks' bipolar method. This method should always be tried before internal version is resorted to." —(Landis' *Obstetrics.*)

SURGERY

1. Inflammation, abscess, tumors (carcinoma, sarcoma, epithelioma, adenoma), Paget's disease of nipple, hypertrophy.

Abscesses are to be opened and drained. *Inflammations*, treated on general principles, by rest, and application of lead and laudanum, or by Bier's suction tubes. Tumors should be removed at once, and if malignant, all lymphatic glands in axilla and over clavicle should be excised.

2. In the *epigastric region* are: Part of stomach, liver, gall-bladder, pancreas, duodenum, suprarenal capsules, and the kidneys.

3. Wounds are: Incised, contused, lacerated, punctured, perforating, gunshot, poisoned, aseptic and septic.

Stab and punctured wounds are generally infected. Infection may be taken in on the weapon making the wound, from clothes, dressings, appliances, instruments, fingers, etc.

4. *Treatment of erysipelas: Prophylaxis.*—Secure the asepsis of all wounds. All cases should be isolated to prevent the infection of others. *Local.*—In most cases all that is necessary is to apply lead, or lead and opium lotion. This has no curative action, but it relieves the stiffness and burning. Other applications, such as ichthyol, are used, but do not hasten the termination of the process. A form of treatment which aims at getting ready a supply of phagocytes at a distance of 2 inches from the spreading margin is the most promising. The skin is irritated by free scarification, and the tissues then become infiltrated with leucocytes, which are ready to attack the cocci when they spread in this region. The part is kept covered with carbolic fomentations (1 in 40). *General.*—Good food and stimulants. The bowels should be kept acting by magnesium sulphate, and 2 to 4 grains of quinine with 15 minims of the tincture of perchloride of iron are generally given every four hours. Antistreptococcic serum sometimes is very useful, either injected or given by the rectum. The treatment of cellulo-cutaneous erysipelas is that of cellulitis."—(*Aids to Surgery.*)

5. CEREBRAL CONCUSSION. *Symptoms:* In bad cases the patient is unconscious, the respirations faint, the pulse weak, and perhaps slow, the muscles flaccid, the pupils equal and reacting to light, but may in very bad cases be dilated and insensitive to light. The skin is pale and cold, and the sphincters may be relaxed. In a few minutes to a few hours improvement may be ushered in by vomiting, or signs of compression may come on and terminate in death.

In the stage of reaction the pulse, respirations, and mental powers, gradually return to the normal standard. Some headache and irritability may remain for a few days. Permanent defects may be left, such as impairment of vision, hearing, or memory, or neurasthenia.

Treatment: Absolute rest, with the head low, combined with warmth to the surface. Stimulants, such as alcohol and strychnine, should be avoided, except in bad cases, for fear of increasing the hemorrhage. In the stage of reaction the diet should be light, and brisk purgatives are necessary. If the unconsciousness is prolonged, the bladder needs to be emptied by a catheter.

6. (1) Indurated ulcer, in region of pylorus; (2) peptic ulcers, in region of pylorus and, posterior wall; (3) acute and (4) chronic ulcers, mostly on posterior wall.

7. Aspiration of the urinary bladder is indicated in retention of urine. Suprapubic puncture is performed as follows: "Having outlined the distended bladder by percussion—a curved cannula and trocar (which are better than the straight) are taken in the operator's right hand, with the convexity upward, and so held, with the index-finger upon the shaft of the instrument, that the depth to which it may enter the bladder is fixed in advance. The bladder is steadied by the surgeon's left thumb and index placed on each side of the median line. The instrument is thrust sharply but gently into the bladder, entering in the median line just above the symphysis pubis, and directed backward and downward—piercing skin, superficial fascia, passing between the inner borders of the recti and pyramidales (or through their muscular substance), prevesical space, anterior bladder-wall, and into the bladder. The trocar is then withdrawn and the cannula left *in situ* until the urine has come away, chiefly of its own accord, and partly aided by gentle pressure. Upon withdrawal of the instrument the opening is at once closed by sterilized cotton and collodion."—(Bickham's *Operatic Surgery.*)

8. A *gumma* may arise in any tissue. The structure of a gumma is a mass of small round cells grouped in special profusion around blood-vessels. The surrounding vessels become narrowed by the accompanying endarteritis, and so the blood-supply of the central part is cut off, and coagulation necrosis occurs. This is the reason the central dry, whitish-yellow slough is seen. The surrounding area is composed of granulation tissue. Under proper treatment the necrosed portion may be absorbed, and only a cicatrix left; but if the gumma be very large or near the surface, it breaks down and the slough is discharged.

Give iodide of potassium, mixed treatment, and tonics.

9. *Ankylosis* is True { Complete.
False. { Incomplete.

Fibrous union follows *erosion* of the cartilages; bony union occurs after *destruction* of the articular cartilages.

10. Spina bifida (myelocele, syringomyelocele, meningomyelocele, meningocele, and spina bifida occulta), sacral and coccygeal tumors, and dermoid cysts.

PHYSICAL DIAGNOSIS.

1. *Examination of bladder.* "The history, symptoms, and character of the urine are considered. Inspection, palpation, and percussion, come next. Instrumental examina-

tion: The patient passes his urine, after which a catheter is introduced, and the residual urine measured. A sound is then passed, and a stone, tumor, or roughness of the wall felt for. A finger inserted into the rectum or vagina before the sound is withdrawn enables one to examine the base of the bladder, prostate, and vesiculæ seminales. Bigelow's evacuator sometimes displays the presence of a small stone by the click which is given. By the cystoscope the inside of the bladder can be looked at. The patient must be anesthetized, the bladder washed out, and 6 ounces of boracic lotion introduced. The instrument must be lubricated with glycerine, not oil. A suprapubic cystotomy is the final resort."—(*Aids to Surgery.*)

2. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs:* Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist râles at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2, *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

3.

AORTIC DISEASE.	MITRAL DISEASE.
Symptoms are mainly due to anemia, viz.:	Symptoms are mainly due to venous congestion, viz.:
1. Pallor.	1. Cyanosis.
2. Throbbing of the carotids.	2. May get pulsation in the veins of the neck.
3. Attacks of an "angina pectoris" type of pain.	3. Sudden attacks of severe dyspnea—actual acute pain is rare.
4. Breathlessness on slight exertion.	4. Breathlessness, but often present without exertion.
5. Nervous symptoms are prominent, owing to cerebral anemia. Syncopal attacks are also common.	5. Pulmonary symptoms are most prominent, *i.e.* cough in the morning, chronic bronchitis, hemoptysis, dilated right side of heart, and later symptoms due to tricuspid leakage.
6. The *left ventricle* is usually much hypertrophied.	6. The *left auricle* is somewhat hypertrophied, but the main hypertrophy is that of the *right ventricle.*

—(From Wheeler and Jack's *Handbook.*)

4. Percussion note gives dullness, more perceptible in flanks; the fluid gravitates; an impulse can be conveyed

from one side to the other; the fluid (and apparent tumor) changes position and shape as the patient changes position; aspiration will show the fluid.

5. Ascites, enlarged veins round umbilicus, jaundice, hemorrhoids edema, and gastric disturbances.

6. *Physical signs of labor pneumonia*—"*Inspection* reveals during the first stage deficient movement of the affected side, due to pain. The apex beat is normal in situation, and the interspaces do not bulge. In the second stage the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air, the diaphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiration).

Palpation during the first stage shows the vocal fremitus to be more distinct than normal, especially over the diseased portions. In the second stage, the vocal fremitus is markedly exaggerated, except in rare instances of occlusion of the bronchi by secretion. The cardiac impulse is felt in the normal position.

Percussion.—In the first stage, the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage, there is dullness over the affected parts, with an increased sense of resistance. Over unaffected adjoining areas, the resonance is increased (Skoda's resonance).

Ausculation.—In the first stage there is heard over the affected part a feeble, vesicular murmur, associated with the true vesicular or crepitant (crackling) râle, heard at the end of inspiration only. In the second stage there is harsh, high-pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion. Bronchophony, or distinctly transmitted voice, is present and at times pectoriloquy, or distinct transmission of articulated sounds may be heard. In the third stage the breathing changes from bronchial to bronchovesicular and the crepitant râle (crepitatio redux) returns As resolution proceeds, the breath sounds are associated with large and small moist and bubbling râles."—(Hughes' *Practice of Medicine.*)

OPHTHALMOLOGY AND OTOLOGY.

1. *Presbyopia* generally appears between the fortieth and forty-fifth years. "The presbyope is compelled to hold reading, writing, sewing, and other forms of near work farther away than the usual distance, making such efforts uncomfortable. With this recession of the near point beyond the usual situation, the print becomes pale and indistinct, and fine type can be read only with great diffi-

culty. The patient is apt to use strong illumination. This produces contraction of the pupil, and thus improves the definition by diminishing the circles of diffusion. If the condition be uncorrected he suffers from asthenopic symptoms, especially pain, fatigue, lacrymation, dimness of vision, and irritation of the lids, all of these symptoms being more marked in the evening with artificial illumination. Presbyopia has no effect upon distant vision."—(May's *Diseases of the Eye.*)

2. *Otitis media* (inflammation of the middle ear, tympanum, or drum cavity) is divided into four clinical forms, viz., acute catarrhal, chronic catarrhal, acute purulent, and chronic purulent otitis media.

Acute catarrhal otitis media is frequently caused by acute coryza and the infectious fevers. There is a painless obstructed sensation in one or both ears, impairment of hearing, and tinnitus. The inflammation causes closure of the eustachian tube.

Acute purulent otitis media: Acute catarrhal otitis media, instead of undergoing resolution, may pass into acute purulent otitis media (especially in exanthemata) from the passage of pathogenic germs from the nasopharynx into the middle ear. The pain will become more intense, the hearing dull, tinnitus will become louder and more distressing, and fever usually sets in.

Chronic purulent otitis media is due to the permanent lodgment of staphylococci in the acutely inflamed middle ear. This unfortunate result is usually brought about by improper—*i.e.* excessive—treatment of acute otitis media, generally by the patient, but sometimes, regrettably, by the physician.

Chronic catarrhal otitis media results from acute catarrhal otitis media that has failed to undergo resolution. Nasopharyngeal catarrh is usually associated with this condition. The onset is gradual, and is characterized by repeated attacks of the acute form, each one increasing in severity. As the symptoms of tinnitus and deafness increase there may be attacks of ear vertigo of tympanic origin. These may be mistaken for neurasthenia, epilepsy, apoplexy, etc. Early in the case there are contraction of the tensor tympani, retraction of the chain of auditory ossicles, and consequent impaction of the stapes in the oval window. *Complications* are inflammation of the mastoid cells, caries and necrosis, phlebitis, meningitis, and brain abscess.—(From Gould and Pyle's *Cyclopedia of Medicine and Surgery.*)

PEDIATRICS.

1. MARASMUS may be congenital, due to poverty or artificial feeding, overcrowding. *Symptoms:* Loss of weight, an

old look, wrinkled skin, legs like drum sticks, prominent abdomen, hollow temples, shrunken fontanels, large eyes, sharp features, anemia, hemic murmur, edema, vomiting, loss of appetite. *Diagnosis* depends on symptoms, but it may be difficult to differentiate it from malnutrition.—(From Holt.)

2. *Modified milk* is cow's (or other) milk in which the proportion of the ingredients has been changed so that the milk may resemble mother's milk as much as possible.

GYNECOLOGY.

1. ACUTE PELVIC PERITONITIS. *Etiology:* Infection. *Symptoms:* Intense and diffuse abdominal pain, tenderness, and distention; vomiting, constipation, elevation of the temperature (103°-104° F.), small, hard, rapid, and wiry pulse (120-140), and increased respiration (30-40) of a painful character are also present. The dorsal decubitus with the legs and thighs drawn up is assumed. The duration is from six to nine days and the prognosis is unfavorable. *The treatment* consists in rest in bed, the administration of opium or one of its alkaloids, and the application of hot or cold fomentations or turpentine stupes to the abdomen. If the affection is due to septic infection a saturated solution of magnesium sulphate should be given. If suppuration has occurred abdominal section should be performed with irrigation of the peritoneal cavity with normal salt solution (temperature 105°-110° F.) and the introduction of drainage.—(Gould and Pyle's *Pocket Cyclopedia.*)

2. UTERINE FIBROIDS are very common. "They are benign, but are harmful on account of the disturbance produced by them when enlarged, and also on account of the various degenerations which they are likely to undergo. Menorrhagia, metrorrhagia, and pain are the common symptoms of the growths, although in patients with large intestinal and subserous fibroids hemorrhage may be absent. In cases of the submucous tumors (fibroid polypi) bleeding may be extreme. The tumors are usually of slow growth, but sometimes they increase very rapidly in size, causing serious pressure symptoms. The diagnosis is sometimes very difficult and always impossible without physical examination. Uterine fibroma may coexist with pregnancy.

The treatment consists in removal. In cases of subserous fibroid the snare may be used when it is pediculated, and when sessile the capsule may be cut and the growth enucleated. In the subserous and interstitial variety if the patient can be kept under observation and the tumor is small operation should be postponed; otherwise a choice should be made between removal of the uterine appendages, ligation of the uterine arteries through the vagina, myomectomy, and hysteromyomectomy."—(Gould and Pyle.)

3. *Cysts of the ovary are classified as:*

Small cysts

1. Follicular.
2. Cysts of corpus luteum.
3. Tuboovarian cysts.
4. Small residual cysts of the hydatid of Morgagni or parovarium.

Large cysts

1. Glandular proliferous or ovarian adenomata — Multilocular. Unilocular. Areolar.
2. Papillary proliferous. — Hyaline.
3. Parovarian — Papillary.
4. Simple or mixed dermoid. — Dermoid.

Follicular Cysts. These are formed from distended and unruptured Graafian follicles. They contain a serous fluid with a specific gravity of 1005 and upward. They vary from the size of a split pea to that of a man's fist.

Cysts of the Corpus Luteum.—May vary in size from that of a walnut to an apple. The tissue of the true corpus luteum will be found by examination with the microscope.

Tubo-ovarian Cysts.—May be produced by the rupture of a small cyst or dilated follicle into the Fallopian tube, when the opening of the latter is bound to the ovary by adhesions, thus forming one cyst. When the Fallopian tube remains permeable, and the fluid contents of the cyst are discharged through the uterus, the condition is known as *profluent ovarian hydrops.*

Cyst of the Hydatid of Morgagni.—Is a small cystic body varying from the size of a pea to that of a cherry. It is attached to the fimbriated extremity of the Fallopian tube by a thin pedicle. It marks the remains of the canal of Müller.

Cysts of the Parovarium or Organ of Rosenmueller.—These may originate either in the vertical or horizontal tubes of the parovarium and may later develop into papillary cysts or those having fluid contents.

Parovarian cysts may be (*a*) *pedunculated*, taking their origin from the tubules of Kobelt; these cysts usually remain small.

(*b*) *Sessile*, arising and remaining between the layers of the mesosalpinx. The second variety may grow to a large size. Cysts of the parovarium contain a clear fluid of alkaline reaction and a specific gravity of not over 1010.

Glandular and Papillary Proliferous Cysts.—The term "proliferous," as applied to cysts, refers to those which are highly organized and abundantly supplied with blood-vessels.

The term "proligerous" cysts is also applied to them and

indicates their faculty of budding and generating new cysts from or within the original growth.

(*a*) *Multilocular cysts* derive their name from the fact that they are composed of a large number of small cysts of about equal size inclosed in one cyst-wall. As these cysts grow to a large size, the walls of the inclosed smaller ones may undergo degeneration and thus one large cyst-cavity is formed. These are known as:

(*b*) *Unilocular Cysts.*—It is supposed by many authorities that all *unilocular* cysts are thus formed from the *multilocular.*

The capsule or cyst-wall is composed of three layers. The *outer layer* is frequently lobulated and is made up of dense fibrous tissue. Columnar epithelium, differing from the pavement epithelium of the peritoneum, covers it externally. The middle layer is composed of connective tissue in which the blood-supply of the cyst is distributed. The internal layer is of fibrous tissue lined by low cylindric cells. Depressions resembling acinous glands are frequently found in sections. The lining membrane may be studded with growths formed from proliferative stroma and covered with a single layer of endothelium. May simulate *carcinoma, myoma,* or *fibrosarcoma.* These cysts vary greatly in size,—they may be as large as an egg or may weigh upward of one hundred pounds.

Much variation is found in the contents of ovarian cysts; indeed, they may be very unlike in different cysts in the same tumor. The color may be yellow, greenish, or dark brown, and the consistency viscid, gelatinous, or thin.

As a rule, the fluid is thicker in the smaller cysts. The specific gravity of the fluid is always *above* 1010.

The cystic fluid contains various albuminous substances, decomposed blood, and granular cells and oil-globules. Cholesterin crystals and rice-shaped bodies are occasionally found.

The pedicle may be composed of the entire broad ligament or folds of the peritoneum, either alone or with an elongated and hypertrophied Fallopian tube and ovarian ligament.

Papillary Cysts.—These originate from the paroophoron in the broad ligament and occasionally in the parovarium. They burrow beneath the layers of the mesosalpinx, and when they attain a large size separate the layers of the broad ligament. They are usually bilateral, do not grow so rapidly nor attain so large a size as multilocular cysts, and produce no effect on the shape of the ovary unless very large. They are filled with a clear fluid and large numbers of warty growths, the latter forming masses which frequently distend the cyst-wall until rupture occurs, when the contents of the cyst are poured out over the perito-

neum, infecting the omentum and any or all of the abdominal viscera.

Dermoid Cysts.—The origin of the dermoids is obscure. According to the theory of impaction, certain portions of the blastodermic structure of the embryo become, during intra-uterine life, impacted by pressure within certain tissues and, late, develop. These cysts occur at all periods of life and contain large and numerous sebaceous or sweat-glands, hair, bone, unstriped muscular fiber, and a substance resembling brain-matter. Hair is very commonly found and may attain to a considerable length. As a rule, it is not the same color as that on the external parts. A putty-like material usually fills these cysts and is composed of a mixture of epithelial débris, oil, cholesterin, and sebaceous matter. Structures resembling mammæ may also occasionally be found. Nervous tissue has never been demonstrated. Dermoid cysts may rupture, causing infection, with general peritonitis; or by their mechanical irritation they may cause suppuration and abscess.—(Wells' *Gynecology.*)

4. The *vaginal route* is to be selected in the operation of cystotomy in the female. "The patient is preferably in Sims' position, with the anterior vaginal wall exposed by Sims' speculum. A large sound is introduced through the urethra and its point pressed against the vesical mucosa in the middle of the long axis of the vesicovaginal septum. An incision is now made upon the sound through the septum with the knife or scissors. The point of the sound will then pass through into the vagina. The opening thus made is enlarged so as to extend one inch in the median line of the long axis of the vesicovaginal septum. Its upper end will be about one-half inch from the anterior wall of the cervix uteri, and its lower end the same distance from the neck of the bladder. The margins of the vesical and vaginal mucosa are then united by fine interrupted catgut sutures."—(Dudley's *Diseases of Women.*)

Trachelorrhaphy: "For trachelorrhaphy the two lips of the cervix are seized with double tenacula and pulled down, an Auvard's speculum retracting the posterior vaginal wall. Denudation is resorted to if necessary. The raw surfaces are united with interrupted sutures of chromic gut. Care must always be exercised to leave a wide cervical canal. For amputation of the cervix, which is required when the injury or sloughing leaves a condition irreparable by plastic surgery, a circular incision is made above the site of the injuries and the cervix is amputated in healthy tissue. The sutures of chromic gut are inserted according to the modified Hegar plan." (Hirst's *Obstetrics.*)

6. *Vaginismus* is a condition of painful and spasmodic

contraction of the vaginal orifice, which renders coitus either painful or altogether impossible. The slightest touch causes painful spasms, and examination may be impossible without an anesthetic. Its *causes* are irritable hymen, ulcer, or fissure anywhere in the immediate vicinity, urethral caruncle, carunculæ myrtiformes, a long perineum with vaginal orifice placed too anteriorly. The *treatment* consists in removing the cause when possible, tonics and general constitutional treatment, dilatation of the vaginal orifice; local application of a 5 per cent. solution of cocaine will relieve the hyperesthesia and allow coitus. The condition is sometimes incurable.

LARYNGOLOGY.

1. The patient is in the sitting position. If a child, it is wrapped in a blanket and held upright on a nurse's lap, looking over the nurse's left shoulder. An assistant steadies the head. A gag is introduced into the mouth, the left index passed back over the epiglottis, and the tube, threaded, and held on the introducer, is guided into the glottis. The introducer is then removed and the gag taken out. If the child breathes freely, the gag is again inserted, the finger placed upon the upper end of the tube, and the thread drawn out.—(Compton.)

RHINOLOGY.

1. NASAL POLYPI. These are of two different origins: (1) Inflammatory, and (2) neoplastic.

(1) *Mucous polypi* are merely edematous granulations hanging from the surface of a diseased ethmoid bone, which is affected by rarefying osteitis or caries. They occur in young adults, and cause nasal obstruction, often bilateral. Grow from the middle and superior turbinate bones. They frequently undergo cystic degeneration from the development of cysts in the glands of the mucous membrane covering them.

Treatment: (*a*) Removal by wire snare under cocaine; (*b*) usually a thorough erasion of the lateral mass of the ethmoid or the opening of a suppurating sinus is required, so as to remove the diseased bone.

(2) *Fibrous and sarcomatous polypi:* Consist in all gradations between fibromata and sarcomata, usually beginning as the former and ending as the latter. Occur in children and adolescents most commonly. Grow from the base of the skull and occupy the nasopharynx. Cause nasal obstruction with sanious discharge. *Pressure signs* may be: (1) Pushing down the velum palati and causing asphyxia; (2) expanding the nasal cavities and producing a widening of the nasal bridge; (3) pressing the eyeballs outward; (4) extending into the base of the brain. *When they are*

malignant secondary growth may occur in the lymph glands of the neck. In these cases the primary growth is probably a lymphosarcoma of the pharyngeal tonsils.

Treatment is only possible in the early stages. (1) Removal by a snare through the anterior nares; (2) removal through the mouth after splitting the soft palate; (3) removal from the face after turning up the soft parts and enlarging the anterior nares by temporary displacement of the maxillæ.—(Grove's *Synopsis of Surgery.*)

MEDICAL JURISPRUDENCE.

1. *Accidental forms of death in the new-born* include: Asphyxia, hemorrhage, atelectasis, convulsions, malnutrition, malformations, neglect.

2. In *burns* produced *before death:* There is usually a blister, with a bright, red base, and containing a serous fluid, which is albuminous; occasionally there will be no blister if there has been excessive shock; also, there will be a red line of demarcation between the injured and the uninjured parts, and this, being a vital process, is only developed during life. In *burns* produced *after death* there is no true blister, no red base, and gas only is present in place of the serous fluid.

STATE BOARD EXAMINATION QUESTIONS.

Indiana State Board of Medical Examiners.

ANATOMY.

1. Describe the kidneys, giving location, size, form, relation to each other and relation to peritoneum.

2. Describe the colon, giving its location, form, situation, divisions and names, and location of flexures.

3. Give the names of the plexuses derived from the solar plexus.

4. If a fracture occurs at the juncture of the middle and lower thirds of the radius, with the line of fracture extending from above downward and forward, what muscles would displace the fragments, and in what directions?

5. Make a drawing of the plantar surface of the foot showing the location of the arteries.

6. Describe the duodenum, giving location, its divisions and important relations.

7. Give the cranial sutures and their locations.

8. Make a drawing showing transverse section of the spinal cord, roots of spinal nerve and spinal nerve trunk with its posterior and anterior divisions, and its relation to the sympathetic nerve cord.

9. Describe the heart, giving location, position, size, general divisions, valves and vessels.

10. Describe the wrist-joint, naming all the bones that enter into its formation.

PHYSIOLOGY.

1. Give the functions of the lymphatic glands and vessels.
2. Describe the pulmonary circulation of the blood.
3. Give the functions of each of the elements of the blood.
4. Define excretion and secretion.
5. How and by what agencies is arterial tension maintained?
6. Explain the physiological processes in the digestion of milk.
7. Name the secretory and excretory organs in parallel columns.

CHEMISTRY.

1. What would occur if sulphuric acid was added to sodium chloride?
2. Give four tests for albumin.
3. Give chemical composition of the blood.
4. Name the enzymes of the body.
5. What is ozone? Give molecular weight, and how does it differ from oxygen?

MATERIA MEDICA AND THERAPEUTICS.

1. Give the different methods of administering drugs.
2. Define therapeutic incompatibility; chemical incompatibility.
3. How is nitrite of amyl administered and for what purpose?
4. Describe the therapeutic uses of sodium chloride.
5. What remedies are employed to correct anemic conditions and how are they used?
6. Mention four preparations of digitalis with the dose of each for an adult.
7. State the name and dose of a drug belonging to each of the following classes: (*a*) emetics; (*b*) diuretics, (*c*) diaphoretics, (*d*) cathartics.
8. What do you understand by specific medication?
9. Give therapeutic action of belladonna.
10. Give therapeutic action of opium.

PHYSICAL DIAGNOSIS.

1. Give distinctions between organic and functional heart murmurs.
2. Give causes and differential diagnosis of cardiac hypertrophy.
3. Give physical signs of aortic regurgitation.

4. (*a*) Define the Cheyne-Stokes breathing. (*b*) Of what disease is it characteristic?

5. Diagnose the following case: "Patient, generally a man past 40, has sudden attacks of vertigo, with tinnitus or incomplete deafness in one or both ears."

PATHOLOGY AND BACTERIOLOGY.

1. Describe an abscess and give its pathogenesis.

2. What do you understand by (*a*) absolute immunity, (*b*) relative immunity, (*c*) acquired immunity?

3. Mention the forms of muscular atrophy, and state upon what each depends.

4. Give the pathology of dysentery: (*a*) catarrhal, (*b*) ulcerative, (*c*) diphtheritic.

5. What do you understand by (*c*) infarction, (*b*) thrombosis?

6. Through what medium is the typhoid infection most commonly conveyed from one person to another?

7. Describe the gonococcus and give the technique of the examination for it.

8. Tell how to differentiate the typhoid from the common colon bacillus.

9. Explain why pathogenic bacteria often prove harmless when taken into the alimentary canal, also why they may not produce disease even when they find their way into the blood current.

10. Name the three general morphological groups of the lower forms of bacteria.

INTERNAL MEDICINE.

1. What conditions predispose to cerebral hemorrhage?

2. What is dysphagia, and with what pathological conditions is it associated?

3. Mention and describe, in regard to the feces, abnormal conditions that are of diagnostic value.

4. State your treatment, including diet, of typhoid fever.

5. Differentiate gastric cancer from gastric ulcer.

6. Give etiology, symptoms, and treatment of acute nephritis.

7. Give etiology, symptoms, and treatment of acute endocarditis.

8. Give diagnosis and treatment of lobar pneumonia.

9. Give symptoms and treatment of tuberculous peritonitis.

10. What is uremia and how should it be treated?

OBSTETRICS.

1. Placenta, give (*a*) function, (*b*) usual location within uterine cavity.

2. Liquor amnii, give (*a*) function, (*b*) composition.
3. Concealed uterine hemorrhage, state cause and give treatment.
4. Early pregnancy, give symptoms (*a*) presumptive, (*b*) positive.
5. Fetal head, in case of failure to engage, what treatment should be employed?
6. Fetal death *in utero*, give (*a*) cause, (*b*) positive sign, (*c*) treatment, and when should it be employed?
7. Prolapsus of cord, state cause and give treatment.
8. Give technique for asepsis in a case of accouchement.
9. If a woman more than seven months pregnant should die suddenly, what effort, if any, should be made to deliver the child?
10. State changes, if any, that take place in the heart of a pregnant female.

GYNECOLOGY.

1. Give general technique of gynecological examinations.
2. Give causes and treatment of inflammation of the vulvovaginal glands.
3. Give diagnosis and treatment of purulent salpingitis.
4. Give differential diagnosis whereby you distinguish ovarian cysts from pregnancy.
5. Give treatment of chronic vesicovaginal fistula.
6. Give technique of operation necessary in lateral tears involving the vaginal sulci.

SURGERY.

1. What is (*a*) sanious pus, (*b*) curdy pus, (c) ichorous pus, (*d*) mucopus, (*e*) seropus, (*f*) blue pus, (*g*) red pus?
2. What are the signs of death of a limited part of the body?
3. Give (*a*) etiology, (*b*) treatment of decubitus.
4. Give symptoms of acute tenosynovitis.
5. Give symptoms of fracture of the pelvis.
6. Give treatment of empyema of the chest.
7. Give treatment of appendical abscess.
8. Give technique of sterilization of the hands.
9. Give treatment of external hemorrhoids.
10. Give treatment of cold abscess.

PEDIATRICS.

1. Bronchopneumonia, acute, give cause, diagnosis, and treatment.
2. Thrush, give diagnosis and treatment.

INDIANA.

NEUROLOGY.

1. Give five characteristic symptoms of tabes dorsalis.
2. What is tetany?
3. Differentiate between upper and lower neurone disease.

MEDICAL JURISPRUDENCE.

1. Define (*a*) syncope, (*b*) collapse, (*c*) shock.
2. When is it legally permitted to produce an abortion?

LARYNGOLOGY AND RHINOLOGY.

1. Give treatment of antral empyema.
2. Give technique of tonsillectomy.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

INDIANA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The kidneys are situated for the most part in the hypochondriac and epigastric regions of the abdomen behind the peritoneum, extending from the 11th rib to within an inch of the crista ilii, the right being placed lower than the left, and lying slightly in the right lumbar and umbilical regions. The average length of each kidney is 4 inches, breadth 2 inches, and thickness, 1 inch. Weight 4½ ounces.

Relations.—The relations of the two kidneys differ somewhat; each is placed so that its anterior surface looks outwards and the posterior inwards, the upper end being nearer the mid-line than the lower. Each kidney is covered partly on its anterior surface by peritoneum.

Relations of the Right Kidney.

In front.	*Behind.*
Right lobe of liver.	Diaphragm.
2nd part of duodenum.	Quadratus lumborum.
Hepatic flexure of colon.	Psoas.
(Of which the last two areas are non-peritoneal.)	Fasciæ covering these muscles.
	Anterior lamella of lumbar aponeurosis.
	Ilio-hypogastric, ilio-inguinal, last dorsal. } Nerves.
	1st lumbar artery.
	Pleura.
	Last intercostal space and 12th rib.

Relations of the Left Kidney.

In front.	*Behind.*
Fundus of stomach.	As on right, except that left kidney, lying rather higher lies over 11th rib.
Postero-internal surface of spleen.	
Tail of pancreas.	
Descending colon.	
(Of which last two are non-peritoneal.)	

Above each kidney is the suprarenal body.
Below each kidney is the iliac crest.

The *external border* is convex, and is placed outwards and backwards.

The *internal border* is concave, directed well forwards, and at the center is the fissure or *hilum*, where the vessels enter and the ureter leaves, lying from before backwards as follows: renal vein, renal artery, ureter.—(*Aids to Anatomy.*)

2. The colon is divided into ascending, transverse descending, iliac, and pelvic. The *ascending colon* extends from the cecum to the under surface of the liver to the right of the gall-bladder, where it turns to the left, forming the *hepatic flexure*. It lies in the right iliac and right hypochrondriac regions. The peritoneum covers the anterior and lateral surfaces. Length, 8 inches. The *transverse colon* passes from right to left, from the gall-bladder to the spleen. It forms an arch, convex anteriorly and below: the *transverse arch of the colon*. It is entirely surrounded by peritoneum, which is attached posteriorly to the spine, forming the mesocolon. Length, 20 inches. The *descending colon* passes from the end of the transverse colon by a bend, *the splenic flexure*. Between the splenic flexure and the diaphragm, opposite the tenth left rib, is a fold of the peritoneum, the *costocolic ligament*, which slings up the spleen. The gut then passes downward to the iliac crest, ending in the iliac colon. The peritoneum invests its anterior and lateral surfaces. Length, 4 to 6 inches. The *iliac colon* is continuous with the descending colon at the left iliac crest, and ends at the inner border of the left psoas. Peritoneum invests its anterior and lateral surfaces; it has no mesentery. Length, 5 to 6 inches. The *pelvic colon* extends from the inner border of the psoas to the level of the third sacral vertebra. Length, 16 or 17 inches; very variable. It has an extensive mesentery.—(From *Aids to Anatomy.*)

3. From the solar plexus are derived: Phrenic plexus, suprarenal plexus, renal plexus, spermatic plexus, celiac plexus (with gastric, hepatic, and splenic plexuses), superior mesenteric plexus, and aortic plexus.

4. In fractures of the radius at the juncture of the middle and lower thirds the upper fragment is drawn upward by the biceps and inward by the pronator radii teres; the lower fragment is drawn downward and inward by the pronator quadratus; the supinator longus also depresses the upper end of the lower fragment towards the ulna.

5. *The Plantar arteries.* The course of the *external plantar* artery corresponds with a line drawn from the hollow behind the inner ankle obliquely across the sole nearly to the base of the fifth metatarsal bone; from thence the artery turns transversely across the foot, lying deeply near the bases of the metatarsal bones till it inosculates with the dorsal artery of the foot in the first interosseous space. The course of the *internal plantar* artery corresponds with a line drawn from the inner side of the os calcis to the middle of the great toe.—(From Holden's *Landmarks.*)

6. THE DUODENUM is the first part of the small intestine, and is so called from being about twelve fingers' breadth in length, is about eight to ten inches in length. It consists of four portions, from the position of its course—ascending, descending, transverse, and terminal ascending. The *first* or *ascending portion* is about two inches in length, and ascends to the neck of the gall-bladder. It is completely invested by peritoneum for about an inch. The *second* or *descending portion*, about three inches in length, descends in front of the right kidney as far as the third or fourth lumbar vertebra, and is overlapped in front by the head of the pancreas, and into its posterior aspect the duct of the pancreas and the common biliary duct open by a common orifice. The *third* or *transverse portion* is attached to the crura of the diaphragm and the vessels in front of the vertebral column, passes behind the transverse mesocolon, and has the pancreas above it, and the superior mesenteric blood-vessels cross from beneath the latter between the two or over the duodenum. The *fourth* or *terminal ascending portion* runs upward and forward to the duodeno-jejunal flexure.—(Young's *Anatomy.*)

7. *Cranial sutures:* Interparietal or sagittal, between the two parietal bones; fronto-parietal, or coronal, between frontal and two parietals; occipito-parietal, or lambdoid, between occipital and two parietals. Fronto-malar, fronto-sphenoidal, spheno-parietal, squamo-parietal, masto-parietal, petro-occipital, masto-occipital, petro-sphenoidal, and squamo-sphenoidal—all of these are situated between the two bones which go to form each name. The basilar suture is situated between the basilar surface of the occipital bone and the posterior surface of the body of the sphenoid.

9. A line from the lower border of the second left costal

cartilage (one inch from sternum) to upper border of third right costal cartilage represents the *base line;* the *right side* will be a line drawn from right side of upper limit to seventh right chondrosternal articulation; the *lower limit* is a line from this last point to the apex (in fifth intercostal space, three and one-half inches from midline); the *left side,* from left end of upper border to left of apex. The valves are: Aortic, mitral, tricuspid, pulmonary (and Eustachian and coronary).

The *aortic valves* are behind the third intercostal space, close to the left side of the sternum. *Pulmonary valves,* in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. *Tricuspid valves,* behind the middle of the sternum, about the level of the fourth costal cartilage. *Mitral valves* behind the third intercostal space, about one inch to the left of the sternum.

In the *right auricle* are the Eustachian and coronary valves; the former is situated between the anterior margin of the inferior vena cava and the auriculo-ventricular orifice; in the fetus it directs the blood from the inferior vena cava through the foramen ovale into the left auricle; the coronary valve prevents the regurgitation of blood into the coronary sinus during the auricular contraction. In the *right ventricle* are the tricuspid and semilunar valves; the former prevent the blood in the right ventricle from flowing back into the right auricle during ventricular systole; the latter guard the orifice of the pulmonary artery. In the *left ventricle* are the mitral and semilunar valves; the former acts similarly to the tricuspid; the latter guard the orifice of the aorta. It is about 5 x 2½ x 3½ inches, and weighs about ten ounces.

10. The *wrist-joint* is a condyloid joint formed above by the lower end of the radius and the triangular fibro-cartilage; and below by the scaphoid, semilunar, and cuneiform. It is united by the following ligaments: External lateral, internal lateral, anterior, and posterior.

PHYSIOLOGY.

1. The *functions of the lymphatic glands and vessels* are: "(1) Mechanical, protective, or regulatory of the circulation, the serous surfaces, bursæ, tendon sheaths, the cerebrospinal fluid. (2) The absorption of digested products, the intestinal lymphatics or lacteals. (3) The formation of the blood in the thymus, bone marrow, spleen, and lymphatic glands. (4) The destruction of injurious materials in the spleen, lymphatic glands, and the lymphadenoid tissue of the respiratory tract, especially the nasopharyngeal section."—(Spencer and Gask's *Surgery.*)

2. *Pulmonary circulation:* Branches of the *pulmonary artery* pass into the lung with the bronchial tubes and

terminate in the *pulmonary capillaries*, which as plexuses lie under the mucous membrane of the walls of the infundibula and alveoli and of the partitions or septa between them. The capillaries have very thin walls and a diameter of about 8 microns, while the spaces between them are even smaller. Small veins collect the blood, and these uniting with others finally discharge into the *pulmonary veins*, which bring the blood back to the left auricle. Some of the blood brought to the lungs by the bronchial arteries returns to the venous circulation through these veins.

3. The *red blood cells* carry oxygen from the lungs to the tissues. The *white blood cells:* (1) Serve as a protection to the body from the incursions of pathogenic microorganisms; (2) take some part in the process of the coagulation of the blood; (3) aid in the absorption of fats and peptones from the intestine, and (4) help to maintain the proper proteid content of the blood plasma. The function of the *platelets* is not determined; it is possible that thev take some part in the coagulation of the blood. The *plasm* conveys nutriment to the tissues; it holds in solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

4. *Secretion* is the process by which certain organs (glands and membranes) separate from the blood certain constituents which are further elaborated and serve some further office in the economy.

Excretion is a similar process by which there are removed from the blood waste materials, and products of no further use to the body, and which if retained would be injurious.

5. *Arterial tension:*

MAY BE RAISED:	MAY BE LOWERED:
1. By the heart beating more quickly.	1. By the heart beating more slowly.
2. By the heart beating more powerfully.	2. By the heart beating more feebly.
3. By contraction of the arterioles.	3. By dilatation of the arterioles.
	4. By deficient supply of blood to the left ventricle.

6. In the *mouth* milk is not altered. In the *stomach* it is precipitated by the rennin; the hydrochloric acid also coagulates milk; the pepsin then dissolves the proteid part into proteoses and peptones. In the *small intestine*

the fat is emulsified, the proteid is further converted into proteoses and peptones by the trypsin of the pancreatic juice.

7. (*a*) *Structures of excretion:* Lungs, kidneys, intestines, skin. (*b*) *Structures of secretion:* Serous and synovial membranes; mucous membranes (glands in mouth, stomach, and intestines); salivary glands and pancreas; liver; mammary glands; lacrymal glands; kidneys; skin; testes.

CHEMISTRY.

1. If sulphuric acid is added to sodium chloride, hydrochloric acid and sodium sulphate result:

$$2\,NaCl + H_2SO_4 = 2\,HCl + Na_2SO_4$$

2. *Four tests for albumins:* (1) They coagulate when heated. (2) When treated with concentrated HNO_3 they become yellow, and change to orange color on the addition of NH_4OH. (3) They become of a purple-red color when warmed to 158° F. with Millon's reagent. (4) Certain metallic salts (solutions of cupric sulphate, mercuric chloride, lead acetate, silver nitrate) will cause coagulation.

3. CHEMICAL COMPOSITION OF THE BLOOD. *Plasma:* Water and solids; the latter containing proteids, extractives, fats, and salts of sodium, potassium, and calcium. *Corpuscles:* Water and solids; the latter containing hemoglobin, globulin, lecithin, cholesterin, iron, and salts of sodium, potassium, magnesium, and calcium.

4. *Enzymes of the body:* Ptyalin, pepsin, trypsin, amylopsin, steapsin, maltase, invertase, lactase, fibrin ferment, rennin.

5. *Ozone* is oxygen in a peculiar state of condensation. the molecule of oxygen contains two atoms, while that of ozone contains three, $3O_2 = 2O_3$. The molecular weight is 48. Ozone is a dark blue liquid; oxygen is a colorless gas.

MATERIA MEDICA AND THERAPEUTICS.

1. *Medicine can be administered:* (1) By the mouth; (2) by the rectum; (3) by inhalation; (4) by inunction; (5) hypodermically; (6) by intravenous injection; (7) by fumigation; (8) by cataphoresis.

2. By *incompatibility* is understood the simultaneous administration or combination of substances not suitable for such combination. *Therapeutic incompatibility* occurs when two agents are administered together which have antagonistic physiological actions, such as morphine and atrophine; this is often intentional. *Chemical incompatibility* occurs when remedies which are mixed together undergo chemical decomposition or explosion.

3. *Nitrite of amyl* is administered by inhalation; in an-

gina pectoris, high arterial tension, cardiac dyspnea, and epilepsy.

4. *Therapeutic uses of sodium chloride:* "Locally, it is of service in affections of the mucous membranes, and salt baths are invigorating as well as cleansing. A strong solution constitutes one of the best injections for threadworms, and salt solutions are also used to limit the action of silver nitrate. Hot salt, enclosed in bags, is a good application in lumbago and various other painful conditions. Internally, as an emetic and also in dyspeptic conditions, administered in carbon dioxide water or in the form of natural mineral waters. Solutions of salt in distilled water are given by intravenous injection or hypodermatoclysis in conditions where the body has lost much fluid, and also in carbon dioxide or coal-gas poisoning and in uremia and similar intoxications. In poisoning by silver nitrate sodium chloride arrests the corrosive action."—(Wilcox's *Materia Medica.*)

5. Iron, arsenic, nux vomica, hypophosphites, and manganese; diet and hygiene. *Iron* is used as tincture of the chloride; *arsenic,* as Fowler's solution; *nux vomica,* as tincture of nux vomica, or as strychnine sulphate; *manganese,* as dioxide of manganese, in pill form.

6. Extract of digitalis, gr. 1/5; fluidextract of digitalis, ♏j; infusion of digitalis, ℥ij; and tincture of digitalis, ♏xv.

7. (*a*) *Emetic:* Apomorphine hydrochloride, gr. 1/10 (hypodermically). (*b*) *Diuretic:* Sparteine sulphate, gr. ij. (*c*) *Diaphoretic:* Solution of ammonium acetate, ℥iv. (*d*) *Cathartic:* Calomel, gr. iv.

8. *Specific medication* means treatment that implies that certain diseases have certain definite remedies which are antidotal. Thus quinine is specific for malaria; antitoxin for diphtheria; mercury and the iodides for syphilis.

9. BELLADONNA. *Physiological action:* Anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood pressure, but toxic doses cause the blood pressure to fall, stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

Therapeutic indications: To relieve pain, relax spasm, check sweating, as a mydriatic for night sweats, to check griping of purgatives; in asthma, to check fevers, in heart disease, shock and collapse, acute coryza, urinary incontinence, chordee, low delirium of fevers, mania, alcoholism; as an antigalactagogue, spasmodic cough.

10. OPIUM. *Physiological action:* It is analgesic, hypnotic, diaphoretic, narcotic, a respiratory and cardiac stimulant (later a depressant), it checks most secretions (not

perspiration), it stimulates the brain, and contracts the pupil.

Therapeutic uses: As an anodyne, a hemostatic, in inflammations, as an expectorant, in diarrhea, in alcoholism, manias and diabetes, as an antispasmodic, in insomnia, and as a diaphoretic.

PHYSICAL DIAGNOSIS.

1. *Organic murmurs* are due to stenosis or incompetency of one or more of the valves of the heart.

Functional murmurs are not due to valvular disease.

Organic murmurs may be systolic or diastolic; may be accompanied by marked dilatation or hypertrophy, and there will probably be a history of rheumatism or of some other disease capable of producing endocarditis. Whereas a murmur, usually systolic, soft, and blowing, heard best over the pulmonic area, associated with evidences of chlorosis or anemia, and affected by the position of the patient, is a *hemic* or *functional* murmur, and denotes as a rule an impoverished condition of the blood.

2. CARDIAC HYPERTROPHY. *Causes:* Overwork, overstimulation, alcohol, excessive exercise, aortic lesions, mitral lesions, myocarditis, emphysema, nephritis, gout, exophthalmic goiter, arteriosclerosis.

CARDIAC HYPERTROPHY: "*Inspection* reveals fullness or prominence of the precordium with a distinct impulse. *Palpation* detects the impulse one or two intercostal spaces lower down and to the left. It is stronger and more or less diffused—the heaving impulse. *Percussion* determines an increase in the area of cardiac dullness vertically and transversely on the left side of the sternum, unless the right ventricle is also hypertrophied, when the cardiac dullness is increased to the right of the sternum. *Auscultation* in simple hypertrophy without any valvular changes detects a loud first sound of a somewhat metallic quality, the second sound being strongly accentuated. In the presence of valvular disease the characteristic murmurs are heard in addition."—(Hughes' *Practice of Medicine.*)

CARDIAC DILATATION: "*Inspection* detects enlargement and distention of the superficial veins and an indistinct, often wavy and diffused, cardiac impulse. If tricuspid regurgitation is present jugular pulsation will be observed. *Palpation* confirms inspection; the impulse is feeble, irregular, and heaving. *Percussion* serves to determine extension of the area of cardiac dullness transversely and especially toward the right side. *Auscultation* in the presence of valvular lesions reveals characteristic murmurs. If there are no valvular lesions the cardiac sounds are weaker than normal and the first sound is sharper in quality than usual."—(Hughes' *Practice of Medicine.*)

3. Strong cardiac impulse; apex beat displaced to left; vessels of neck pulsate; diastolic thrill can be felt; pulse is characteristic (Corrigan's pulse); capillary pulsation may be seen under finger nails, area of dullness is increased; diastolic murmur can be heard at base of heart, over sternum, at level of third intercostal cartilage.

4. In *Cheyne-Stokes respiration* the respirations gradually increase in volume and rapidity until they reach a climax, when they gradually subside, and finally cease for from ten to forty seconds, when the same cycle begins again. "In the majority of instances it is associated with apoplexy (toward the end), chronic nephritis (uremia), tumor of the brain, tuberculous meningitis, or degeneration of the heart muscle. Less frequently it is observed as a result of cardiac valvular defects and consequent embolism, diabetes, and certain acute diseases, notably typhoid, pneumonia, pertussis, cerebrospinal fever, scarlet fever, and septicemic conditions."—(Butler's *Diagnostics of Internal Medicine.*)

5. Possibly Ménière's disease; but in practice it would be exceedingly unwise to make any diagnosis on such very meager data.

PATHOLOGY AND BACTERIOLOGY.

1. *An abscess* is a cavity of new formation containing pus. The bacteria which have gained access to the tissues grow and produce their toxins, and these diffuse into the surrounding structures, giving rise to acute inflammation; the vessels dilate, acceleration of the blood stream occurs, and is followed by retardation and thrombosis, and the leucocytes emigrate. The toxins then act still more powerfully on the injured tissues and destroy their vitality, usually by a process of coagulation-necrosis. A section through the lesion at this stage will show two well differentiated zones: a central area in which the tissues are dead, have lost their staining properties, and contain the pyogenic bacteria; and a peripheral zone of ordinary acute inflammation, which fades gradually into the surrounding healthy tissues. The inflamed zone, as is usual, is thickly infiltrated with leucocytes, and on examination these will be found to be mainly of the polynuclear variety.—(Rose and Carless.)

2. *Immunity* is the power of resistance of cells and tissues to the action of pathogenic bacteria. This is almost never *absolute*. Immunity may be either natural or acquired.

Natural immunity is this power of resistance, natural and inherited, and peculiar to certain groups of animals, but common to every individual of these groups.

Acquired immunity is this resistance acquired: (1) By

a previous attack of the disease, caused by the bacteria, or (2) by the person being made artificially insusceptible. The conditions which give immunity from the pathogenic action of bacteria are: (1) A previous attack of the disease; (2) inoculation, with small quantities of bacteria, so as to produce a mild attack of the disease; (3) vaccination; (4) the introduction of antitoxins; (5) the introduction of the toxins of the bacteria.

3. MUSCULAR ATROPHY. "*Simple atrophy* occurs as a senile change and from disuse. *Neuropathic atrophy* occurs when a muscle is separated from its trophic center (the nerve cells of the anterior horns of the spinal gray matter), and follows section or inflammation of a mixed nerve, or anterior poliomyelitis; it is most typically seen in the latter in infantile paralysis. *Progressive muscular atrophy* may be of the same nature, but chronic in course, though it is considered by some to be a primary disease of the muscles, with secondary degeneration of the spinal nerve cells. In the juvenile forms and in the pseudohypertrophic paralysis the atrophy seems to be a primary one of the muscles."—(Hewlett's *Pathology.*)

4. DYSENTERY: "In the mild or *catarrhal* forms there is congestion and edema of the mucosa with some petechiæ. There is a slight increase in the secretion, and ulcerations may be found involving the solitary follicles.

The *ulcerative* or *amebic* variety is much more severe. There is at first a marked nodular swelling of the mucosa. The organisms pass between the epithelial cells of the mucosa, undermine the membrane, and by increasing in numbers separate it from the blood-supply. The mucous membrane at these points becomes necrotic and is cast off, exposing the infiltrated submucosa, which eventually sloughs off. The resulting ulcers vary greatly in size and shape, but are all characterized by having a decidedly undermined edge. Several ulcers may have communications beneath the mucosa and the ulcerations may extend to the serous covering. The amebæ will be found in the lesions. The process tends to become chronic, and for a long time the amebæ may be found in the stools, which also contain large amounts of pus. As the inflammation subsides the ulcerations begin to cicatrize and recovery takes place. There is usually quite extensive atrophy of the mucosa and sometimes distortions due to contraction of the healed ulcers. The most common complication is abscess of the liver, which in amebic dysentery is usually single. There may secondarily result a *diphtheritic* dysentery; a variety in which there is formed a pseudo-membrane which occurs in varying extent. There may be numerous small areas so covered, or the entire colon and rectum may be involved. If the process is mild the mucous membrane is alone in-

volved; but if severe the submucosa may be destroyed."—(McConnell's *Pathology.*)

5. By *Infarction* is meant the plugging of a terminal artery generally by an embolus or thrombus. By *Thrombosis* is understood the coagulation of blood within the heart or blood-vessels during life.

6. "Food, fingers, and flies."

7. The *Gonococcus* is a diplococcus with a special predilection for the mucous membrane of the urethra and vagina. It is sometimes found on the conjunctiva. The appearance is that of two coffee beans; the gonococcus is found in the pus cells, stains with ordinary anilin dyes, but not by Gram's method. It is aërobic, and can be cultivated on human blood serum; it will not grow on gelatin, agar, bouillon, or potato. It was discovered by Neisser.

To demonstrate *gonococci:* On a cover-glass make a smear with the discharge as thin as possible, and let it dry in the air; cover it with a freshly made solution of anilin-oil-gentian-violet for one or two minutes; wash it in distilled water; leave it in Gram's solution for two minutes; wash it in 95 per cent. alcohol until decolorized; wash it in distilled water; counterstain with a dilute carbolfuchsin without heat, or with a saturated aqueous solution of Bismarck brown; wash in distilled water, dry with filter paper, mount, and examine with an oil-immersion lens. The gonococci will appear as *diplococci within the leucocytes,* which have been *decolorized by Gram's stain,* and have taken the counterstain.

8. *To distinguish the typhoid bacillus from the colon bacillus:* (1) On gelatin plates the colonies of typhoid develop more slowly than those of colon bacillus. (2) The colon bacillus causes fermentation with production of gas in media which contains sugar; the typhoid bacillus does not. (3) The colon bacillus produces a strong acid reaction and coagulates milk within twenty-four to forty-eight hours; the typhoid bacillus does not coagulate milk. (4) In peptone solution the colon bacillus produces indol; the typhoid bacillus does not. (5) The typhoid bacillus gives the Widal reaction with typhoid serum; the colon bacillus does not.

9. The gastric juice destroys very many bacteria; certain cells in the blood have also the power of destroying bacteria. Further, a *sufficient quantity* of bacteria must enter the body, and by the *proper channel.*

10. The three basic forms of bacteria are: (1) The *coccus,* which is round or oval, and may appear singly, in pairs, in groups of four, in chains, or in bunches. (2) The *bacillus,* which is rod shaped, with the longer sides parallel and the short ends either straight, rounded, or concave. (3) The *spirillum,* which is spiral.

INTERNAL MEDICINE.

1. Violent muscular effort, injury, anger, nervous excitement, intoxication, over-eating, arteriosclerosis, nephritis, gout.

2. *Dysphagia* means painful or difficult swallowing. It is associated with the following causes: (1) *Pharyngeal, e.g.* acute or chronic inflammation, whether simple, scarlatinal, diphtheritic, etc.; ulceration of syphilitic or malignant origin; stenosis, as a result of ulceration; paralysis (*e.g.* labio-glosso-laryngeal or bulbar) or spasm; impaction of foreign bodies; nasopharyngeal polypi projecting behind the velum; retropharyngeal abscess or tumor, etc. (2) *Laryngeal, e.g.* acute or chronic laryngitis; tuberculous, syphilitic, or malignant disease. (3) *Esophageal, e.g.* acute or chronic inflammation, impaction of foreign bodies, the presence of diverticula, esophagospasm, and simple or malignant stricture. (4) *Extrinsic:* In the *neck:* goiter, enlarged glands, aneurysms, etc.; in the *thorax:* mediastinal growths or glands, aneurysms of the aorta and large vessels, tumors growing from the vertebral bodies, pericardial effusion, and displacement backwards of the sternal end of the clavicle.—(Rose and Carless.)

3. The feces may be examined *microscopically* for: The *Ameba coli* in dysentery; the *Spirillum* of cholera; the *Bacillus typhosus* in typhoid fever; the *Tænia solium;* the *Oxyuris vermicularis,* and other parasites and bacteria. *Chemical* examination might show the presence of mucin, blood, albumin, peptones, and bile pigment. *Spectroscopic* examination might possibly show the presence of blood.

4. Rest in bed, good nursing, perfect quiet, mouth must be kept clean, drugs are only given when specially indicated, cold baths to reduce temperature; milk is the best food, three or four pints a day, vichy or carbonated water can be added, white of egg, cream soups, wine jelly, ice cream.

5. *Gastric ulcer* is generally caused by injury or bacteria, is most apt to occur between the ages of twenty and forty-five; after eating there is pain localized in the stomach, vomiting occurs soon after eating, hematemesis is common, there is localized tenderness over the stomach, and examination of the gastric contents shows an excess of free HCl; there is no epigastric tumor, though the stomach walls may be somewhat thickened.

Cancer of stomach does not usually occur before forty years of age, is more common in males, the pain is localized and constant, vomiting is copious and occurs some time after eating; the vomitus contains "coffee ground" material; hemorrhages are common; a tumor may be palpated, and examination of the gastric contents shows ab-

sence of free HCl and presence of lactic acid; there is progressive emaciation; severe anemia and cachexia are also present.

6. *Acute nephritis. Etiology:* Infectious fevers, exposure to wet or cold, alcoholism. *Symptoms:* "The first evidence of the affection is the edematous condition of the face. This edema may extend and produce general anasarca. The urine is scanty, smoky in color, and of a high specific gravity. It usually contains albumin, blood cells, blood casts, epithelial casts, hyaline casts, and free renal epithelium. It may contain pus cells and pus casts, and in prolonged cases dark granular casts and dark granular cells are common. Retention of urine, uremia, intense itching of the skin, dyspnea, delusional insanity, and various palsies may occur in the course of the affection. *The treatment* consists largely in rest in bed, warmth, milk diet, and attempts at elimination of waste products. Free purgation should be secured by means of the salines, calomel, or compound jalap powder. Diaphoresis may be favored by the administration of sweet spirits of niter, and in severe cases pilocarpin, and by the use of warm baths, warm applications, or the vapor bath. Tincture of digitalis (m̃5-20 every 4 hours), tincture of strophanthus, or sparteine (gr. ¼-½) may be given as diuretics. Infusion of cream of tartar and juniper berries may be employed. The occurrence of uremia will require prompt and energetic measures."—(*Pocket Cyclopedia.*)

7. Acute endocarditis. *Etiology:* Micoorganisms, rheumatism, chorea. *Symptoms:* Cardiac murmur, systolic or diastolic, or presystolic; rise of temperature; dilatation of heart. *Treatment:* Rest in bed; treat the cause and watch for complications.

8. Lobar pneumonia is diagnosed by the physical signs: sudden onset with chill, pain in side, cough, high and regular fever, rusty colored sputum with diplococci, and the bounding pulse. "*The treatment* consists in rest in bed, milk diet, and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice-bags or compresses wrung out of cold water (60°-70° F.) to the chest, or by the use of the warm or cold wet pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60 to 1/20), atropin, caffein, stropanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first forty-eight hours. Convalescence should be guarded,

and tonics, stimulants, etc., will be found very useful in this period of the disease."—(*Pocket Cyclopedia.*)

9. TUBERCULOUS PERITONITIS. *Symptoms:* The general health becomes depressed, and constipation alternates with diarrhea. There is some abdominal pain, and wasting soon becomes marked. The abdomen is tender, and may or may not contain free fluid. *Treatment* is by hygiene and good feeding at first. If this fails simple laparotomy often cures the ascitic variety, sometimes the fibrous, but seldom the ulcerous. It is not necessary to wash out the abdominal cavity, but only to drain away the fluid and stitch up the opening. Laparotomy may also be required to relieve intestinal obstruction, fecal fistula, or localized abscesses.—(*Aids to Surgery.*)

10. *Uremia* is a form of autointoxication, some nitrogenous substance is being absorbed instead of excreted. *Treatment:* Epsom salt, nitroglycerin, morphine; milk or light diet, no stimulants or nitrogenous foods; hot bath; chloral or chloroform to control convulsions.

OBSTETRICS.

1. PLACENTA. *Functions:* (1) To supply nourishment to the fetus; (2) to act as a respiratory organ for the fetus; (3) to act as an excretory organ for the fetus. Its *usual location* is on the anterior or posterior wall of the uterus, near the fundus.

2. LIQUOR AMNII. *Functions:* (*a*) *During pregnancy:* (1) As a protection to the fetus against pressure and shocks from without. (2) As a protection to the uterus from excessive fetal movements. (3) It distends the uterus, and thus allows for the growth and movements of the fetus. (4) It receives the excretions of the fetus. (5) It surrounds the fetus with a medium of equable temperature, and serves to prevent loss of heat. (6) It prevents the formation of adhesions between the fetus and the walls of the amniotic sac. (7) It has been supposed, by some, to afford some slight nutrition to the fetus. (*b*) *During labor:* It acts as a fluid wedge, and dilates the os uteri and the cervix; it also slightly lubricates the parts.

Composition: Chiefly water, but it contains also small amounts of albumin, epithelial cells, urea, phosphates, chlorides, etc.

3. *Concealed uterine hemorrhage. Cause:* Separation at center of placenta, the edges still being adherent; detachment of placenta at upper margin only; plugging of parturient canal, and thus hemorrhage from any cause cannot escape. *Treatment:* Administer ergot, dilate cervix, and deliver as rapidly as possible.

4. *Positive signs of pregnancy:* (1) Hearing the fetal

heart sound; (2) active movements of the fetus; (3) ballottement; (4) outlining the fetus in whole or part by palpation, and (5) the umbilical or funic souffle.

Doubtful signs of pregnancy: (1) Progressive enlargement of the uterus; (2) Hegar's sign; (3) Braxton Hick's sign; (4) uterine murmur; (5) cessation of menstruation; (6) changes in the breasts; (7) discoloration of the vagina and cervix; (8) pigmentation and striæ; (9) morning sickness.

5. Empty the bladder and rectum; determine if there is a faulty presentation, as bregma, brow, or face. Measure diagonal conjugate and height of symphysis and determine the true conjugate. If this latter measures less than 2¾ inches in a simple flat pelvis, or 3 inches in generally contracted pelvis, the contraction is absolute, and only cesarean section or craniotomy is possible. Ascertain by palpation whether there is serious disproportion between head and pelvis. Malpresentations must be corrected with one hand in vagina pressing upward on the fetal anterior portion of the presenting part, and if possible drawing down in the occipital pole, aided by external manipulation. Press the head downward into the pelvis; this maneuver may be aided by Walcher's position. If there is marked disproportion, cesarean section and craniotomy must be considered. If disproportion is apparently not insuperable, rupture the membranes just after the acme of a pain, when the cervix is fully dilated, keeping the patient in Walcher's position. If the head thereupon engages during the next few pains, allow spontaneous delivery, or aid with forceps if necessary. If the head still refuses to engage, apply axis-traction forceps in Walcher's position, tentatively; if unsuccessful, perform podalic version by combined or internal method. If membranes have already ruptured, note whether there is marked retraction ring. If not, podalic version is proper, subject to limitation of slight disproportion; but if the uterus has retracted markedly, forceps, and that failing, onlv cesarean section, symphyseotomy, or craniotomy is admissible.—(From Scott's *State Board Obstetrics.*)

6. *Fetal death. Causes:* Syphilis, apoplexy of placenta or membranes, diseases of ovum or uterus, nephritis, poisoning (including tobacco and alcohol). *Positive sign:* Failure, after repeated examinations, to get the fetal heart sounds and movements after they have been obtained on previous occasions. *Treatment:* Induction of abortion or premature labor, at once, with complete removal of the contents of the uterus.

7. *Prolapse of cord. Causes:* Malpositions and malpresentations, multiple pregnancy, sudden escape of liquor amnii, too small fetal head, too large pelvis or abdomen of mother. *Treatment of prolapsed funis* consists in: (1)

Not rupturing the membranes prematurely unless there is some positive indication; (2) postural treatment, in which the woman is placed on her back or on the opposite side to that on which the cord lies, with hips and pelvis elevated, or the knee-chest position may be adopted; (3) reposition of the cord, either manually or with some form of repositor; (4) speedy delivery, by forceps or podalic version.

8. "The patient should receive a full bath before labor begins and all bed clothing and personal clothing should be clean. If there is any pathological discharge from the genitalia the vagina should be thoroughly scrubbed with tincture of green soap and hot water, followed by a mercuric chloride douche (1:2000); this followed by a douche of sterile water. The physician's hands should be scrubbed for ten minutes with tincture of green soap and hot water, followed by alcohol, and immersion in mercuric chloride (1:1000). All instruments should be boiled for ten minutes or immersed in mercuric chloride (1:1000) for half an hour. Examination to determine the position, presentation, size of the fetus, etc., should only be made when absolutely necessary."—(From *Pocket Cyclopedia.*)

9. A cesarean section should be performed at once.

10. There is a hypertrophy and a dilatation of the left ventricle.

GYNECOLOGY.

1. The patient should be free from corsets and constricting bands; the bladder and rectum should be empty. *External palpation:* The patient should be in the lithotomy position, on a suitable table or bed. The examiner stands on one side, and palpates the lower abdomen to determine any enlargement of the uterus. *Vaginal touch:* The examiner separates the labia with the thumb and finger of one hand; and two fingers of the other hand well lubricated are introduced into the vagina. Pressure is made on the perineum until the posterior fornix is reached, when the palmar surfaces are turned forward and the size, position, and condition of the cervix are determined. Then with the palmar surface of the external hand gentle pressure is made on the abdomen and the two hands are approximated. Thus the size, consistency, and position of the uterus are determined. *Rectal examination:* In virgins and in some cases of extreme retroversion one finger is introduced into the rectum and with the other hand on the abdomen a more satisfactory bi-manual examination can be made. *Instrumental examination:* In the lithotomy position, by the use of a bi-valve, a tubular or Ferguson speculum, the condition of the cervix can be inspected. This is best accomplished in some cases by use of the

Sims position and the Sims speculum. At the same time in rare and selected cases by steadying the anterior lip of the cervix with a bullet forceps the uterine sound may be passed to determine the size and position of the uterus.

2. *Inflammation of the vulvovaginal glands. Causes:* Trauma, gonorrhea. *Treatment:* Hot or cold antiseptic applications, rest, salines; if an abscess results, excision or incision and drainage.

3. PURULENT SALPINGITIS. *Symptoms:* A dragging sensation in the neighborhood of the affected tube; colicky pain, which is increased on exertion or even on standing; abdominal tenderness; menstrual disorders, as amenorrhea, metrorrhagia, dysmenorrhea, menorrhagia; dyspareunia; there may be septic symptoms and peritonitis; sterility generally ensues. On examination there will be found a fullness in Douglas' pouch and one or both lateral fornices; in these latter will be felt either the tubes, distorted and possibly adherent, or a sausage-shaped tumor, which is very painful; the uterus is retroverted or retroflexed, and may be bound down by adhesions; there may be an intermittent expulsion of pus, accompanied and preceded by a burning pelvic pain. There will be a leucocytosis. *The treatment* of the acute form consists in rest in bed, free purgation with Rochelle salts (3i every hour), hot vaginal douches, and hot applications to the abdomen. If the symptoms become more severe celiotomy is indicated. The chronic form may be treated during the menstrual period by rest in bed, free purgation, hot vaginal douches, local applications of iodine to the cervix and vaginal vaults, and glycerin tampons. If these measures fail removal of the tube and ovary and replacing the retroverted uterus, etc., are necessary.

4. *Differential diagnosis. Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor, and the general condition of the patient's health may also help in arriving at a diagnosis.

Ovarian cyst: Absence of the chief signs of pregnancy; there may be the characteristic facies, the tumor is soft, fluctuating, is more to one side, and does not show fetal signs.

5. *Treatment of vesicovaginal fistulæ:* "The principles underlying the treatment of all fistulæ of mucous canals apply here, namely: (1) The vivifying of the edges of the fistula; (2) the careful suturing of the edges; (3) immediate union. (1) Access to the vagina is obtained by means of a duckbill speculum held by an assistant. The margins of the fistula pared by means of a sharp, delicate

knife mounted on a long handle. These knives are usually supplied in sets of three or four, with the blades adjusted at different angles to meet any difficulty according to the position of the fistula. In paring the edges care is taken to avoid bruising, but it is necessary to thoroughly vivify the whole circumference of the fistula. (2) The sutures may consist of silk thread or silkworm gut. Whatever material is used it should be introduced with a slender needle, and should traverse the muscular but not the mucous coat of the bladder or urethra. This stage affords much scope for ingenuity on the part of the operator. After the sutures are fastened it is wise to test the wound to ascertain if it be watertight. For this purpose milk is injected into the bladder. Should any escape through the wound an additional suture is inserted at the situation of the leak. If all be secure the bladder and vagina are gently irrigated with warm water and the patient returned to bed."—(Sutton and Giles' *Diseases of Women.*)

6. All tears should be repaired as soon as possible (unless there are contraindications). A primary operation is best because the edges are fresh and can be approximated; little (if any more) anesthetic is wanted; the woman has to lie in bed, and therefore only one absence from household work is requisite; infection is less likely. In any case, operation may prevent rectocele, cystocele, prolapse of uterus, and general weakness, malaise, and disability.

Operation for lacerated perineum: "The labia are seized with Allis' forceps at the level of the lowest carunculæ myrtiformes. A guide stitch is placed in the posterior vaginal wall directly under the external urinary meatus. By pulling one Allis' forceps and the guide stitch in opposite directions outward and downward, the posterior sulcus is exposed; denudation is required, even in a recent tear, for a part of it is always submucous. The other sulcus is exposed and denuded. Then by holding the guide stitch upward in the middle line and pulling the forceps apart the mucous membrane between the sulci is denuded or freshly torn surfaces covered with granulation-tissue are scraped with the edge of a knife. The ruptured levator ani muscle in the posterior sulci is united with a double tier suture of chromic gut, two half-stitches being taken in the stitch as it turns upward after coming down from the apex of the wound, in its deeper portion to the base. One knot at the apex of the sulcal denudation secures the stitch. The retracted ends of the transversus perinei and bulbocarvernosus muscles are brought together by silk worm sutures. Finally, a single stitch at the top of the perineal wound unites the posterior commissure of the vulva, restoring the fossa navicularis. The perineal

stitches are knotted; they are removed on the twelfth day."—(Hirst's *Obstetrics.*)

SURGERY.

1. *Sanious pus* is pus containing blood or hemoglobin.

Curdy pus is tuberculous material, and often is not pus at all.

Ichorous pus is thin, watery, putrid pus.

Mucopus contains pus and epithelial cells.

Seropus is a thin serous fluid with very little pus.

Blue pus is due to the presence of the *Bacillus pyocyaneus.*

Red pus is due to the presence of the *Bacillus prodigiosus.*

2. *Signs of local death:* Loss of pulsation in the vessels of the part; loss of heat; loss of sensation; loss of function; change of color to purple or waxy appearance.

3. DECUBITUS. (1) *Causes:* Undue pressure and irritating secretions; a crease or fold in a sheet, a crumb of bread, a feather, or a bit of string on the sheet may be the cause. Especially is this so when the skin is irritable from excessive perspiration, inefficient washing, or involuntary passages of urine. Bedsores are particularly common in spinal affections and in wasting diseases. (2) *Prevention* consists in reducing the pressure, careful repeated washing, drying, and dusting with zinc oxide, and subsequent protection with lint or cotton-wool, etc. Leather-backed adhesive plaster may be applied over bony prominences, or, if seen early, collodion may be used. Frequent rubbing with alcohol may prove a preventive. When congestion appears a water-bed or air-cushion may be used. Spirits of camphor or glycerol of tannin may be rubbed in twice daily, to harden the skin. Salt and alcohol (two drams to the pint) may also be used. (3) *Treatment:* A solution of silver nitrate may be used when the skin is about to break, in the strength of gr. 20 to the ounce; and in solution of gr. 10, daily, when the skin breaks. The sloughs should be removed as fast as they form. Stimulation, good nourishment, and sleep are valuable in treatment.—(From Gould and Pyle's *Cyclopedia of Medicine and Surgery.*)

4. Pain, pressure, swelling, tenderness, moist crepitus; if suppuration is present, there will be also discoloration, intense throbbing pain.

5. History of accident (violent force), shock, ecchymosis, inability to stand or move, and intense pain or attempts to move or cough, unnatural mobility, and crepitus.

6. Aspiration, drainage, irrigation, resection of ribs (Estlander's operation) or resection of chest wall (Schede's operation).

7. "Where pus is present or suspected, the abdomen should be opened over the swelling, and in most cases it will be found that there are adhesions to the anterior abdominal wall, shutting off the abscess cavity from the rest of the abdomen. A finger should be gently inserted to feel for and remove a concretion or the appendix; but no prolonged search should be made for the appendix for fear of breaking down the adhesions. A large rubber drainage-tube should be inserted, and the cavity will soon become clean and heal by granulation. If, when the abdomen is opened, no adhesions to the anterior abdominal wall are found, the cavity should be protected with gauze packing. The abscess will then be found among a mass of matted omentum and intestine, and can be opened by gently separating them. A drainage-tube is inserted, and the gauze packing is left in for three days. By that time firm adhesions have formed and the peritoneal cavity is safe from infection." *(Aids to Surgery.)*

8. The hands and arms of the operator and of the assistants should be thoroughly scrubbed with green soap and sterile water for at least 10 minutes with several changes of water. They are then scrubbed with alcohol and immersed in mercuric chloride solution (1:1000). Nothing that has not been made sterile should be touched or handled by the operator or the assistants.

9. Incise, turn out the clot, and pack with iodoform gauze.

10. Open the abscess with antiseptic precautions; turn out the contents; curette the walls of the abscess, and irrigate; remove any sequestra; leave some iodoform in the cavity; sew up.

PEDIATRICS.

1. BRONCHOPNEUMONIA. *Causes:* Probably as infection, but microorganism not identified; mixed infection; secondary to measles, diphtheria, scarlet fever, whooping cough, influenza, erysipelas, tuberculosis, asthma, emphysema. It is diagnosed by violent cough, high temperature, sometimes convulsions, dyspnea, rapid and feeble pulse, fine subcrepitant and sibilant râles may be heard. *Treatment:* Rest in bed, nutritious diet, room temperature about 70° F., fractional doses of calomel, aconite for the first day or two, cotton jacket, syrup of ipecac.

2. *Thrush.* An affection of the mouth characterized by a catarrhal condition and by the presence on the mucous membrane of white, flake-like patches. It occurs usually in young infants, and is caused by a vegetable parasite (one of the mold fungi) variously known as oidium albicans or saccharomyces albicans. It results from uncleanliness.

The treatment consists in cleansing the nipple and the

child's mouth frequently, the administration of fractional doses of calomel, and the use of mild alkaline mouth-washes.

NEUROLOGY.

1. *Symptoms of tabes dorsalis:* Loss of coordination; characteristic and unsteady gait; tendency to stagger when standing up with feet together and eyes closed; sharp and paroxysmal pain, called *crises;* girdle sensation; loss of knee-jerk and other reflexes; Argyll-Robertson pupil.

2. *Tetany* is an affection attended with intermittent paroxysmal or continued spasms of groups of muscles, generally in the upper extremities, and without loss of consciousness.

3. "*Symptoms of affection of the upper efferent neurons.* —The paralysis is spastic in type, so that muscular rigidity is associated with the motor weakness. There is no muscular atrophy other than such slight general wasting as can be accounted for by disuse, and the electrical excitability of the muscles is unaltered, except in the direction of a slight increase or decrease of excitability. The qualitative changes that characterize the reaction of degeneration are never met with. The tendon jerks are increased, so that the knee jerks are exaggerated and ankle clonus is commonly present. The plantar reflex usually becomes altered so that the toes extend instead of flexing when the sole of the foot is stimulated and the great toe is notably drawn up toward the dorsum of the foot. This is known as the extensor type of response or Babinski's sign. As these neurons are purely motor, no blunting of sensibility occurs.

"*Symptoms of affection of the lower efferent neurons.*— The paralysis is flaccid in type. Spasticity is never present, though in long-standing cases contractures due to unequal affection of opposing muscles occur. The affected muscles atrophy, and they present the alterations in electrical excitability that constitute the reaction of degeneration, loss or diminution of faradic excitability and qualitative changes in the galvanic reactions so that A.C.C.> K.C.C. The tendon jerks are abolished, ankle clonus is never present and the plantar reflex is either abolished or, if preserved, is of the normal type. As long as the lesion is limited to the anterior horn cells and the efferent motor roots, there is no blunting of cutaneous sensibility, but when mixed nerves are affected, as they contain afferent sensory, as well as efferent motor fibers, anesthesia—usually slight in degree—is observed. Trophic disturbances occur, and include hyperidrosis and glossy skin, in the latter class of case, but not when the lesion is limited to the anterior horn cells."—(Bain's *Practice.*)

MEDICAL JURISPRUDENCE.

1. *Syncope* is sudden loss of consciousness due to acute anemia of the brain.

Collapse is sudden prostration due to causes not strictly surgical, as in some poisonings.

Shock is sudden prostration due to surgical or traumatic causes.

2. *Abortion is justifiable:* "(1) In pelvic deformity where there is sufficient space for a seven months' child to be delivered without injury. The object is twofold: (*a*) to save the child's life by obviating the necessity for craniotomy; (*b*) to spare the mother the dangers of craniotomy, cesarean section, symphyseotomy, or other operations that might be required if the pregnancy went to full term. (2) In cases where, in previous labors, the head of the child at full term has been prematurely ossified, or unusually large, so that labor has been difficult and dangerous, even though the pelvis were normal. The period of delivery need only be two or three weeks before 'term' in these cases. (3) In cases where the children of previous pregnancies have died *in utero* during the later weeks of gestation from disease (fatty, calcareous, or amyloid degeneration, etc.) of the placenta. (4) In conditions where the continuance of pregnancy seriously endangers the mother's life, such as: excessive vomiting; albuminuria; uremic convulsions, or paralysis; chorea; mania; organic disease of the heart, lungs, liver, blood-vessels, etc., threatening fatal disturbance of the respiration, circulation, and other vital functions; irreducible displacements of uterus; placenta previa with hemorrhage; and in dangerous pressure upon neighboring organs from over-distention of uterus, due to dropsy of amnion, tumors, multiple pregnancy, etc."—(King's *Manual of Obstetrics.*)

LARYNGOLOGY AND RHINOLOGY.

1. *Treatment of empyema of the antrum* consists in frequent irrigation of the cavity through a hole made into it. The hole may be made through the socket of either of the bicuspids or first two molars—the first molar for preference, but whichever is carious should be extracted. A metal tube should be kept in the opening till discharge has ceased. If none of these teeth are carious, a hole should be made through the inferior meatus ½ inch behind the anterior end of the inferior turbinate bone, and irrigation performed through this. Cases which persist in spite of this are treated by opening the cavity through the canine fossa, scraping the walls thoroughly and draining it through a large opening into the inferior meatus of the nose. All

polypi or diseased bone must, in addition, be removed from the nose.—(*Aids to Surgery.*)

2. TONSILLECTOMY. *By guillotine:* The parts are painted with 5 per cent. cocaine. The tonsil is made to protrude by pressure behind the angle of the jaw. The guillotine is then applied and a slice of tonsil removed. *By the knife:* The lowest part of the tonsil is grasped with forceps and drawn inward, and a portion cut away with a blunt-pointed histoury. The knife should cut upward and rather inward. *Enucleation* may be done in children. The mucous membrane in front of the tonsil is divided, the tonsil shelled out, and the posterior reflection of mucous membrane snipped through. Bleeding, if protracted, can be stopped by the application of adrenalin or ice.—(COMPTON.)

STATE BOARD EXAMINATION QUESTIONS.

KANSAS STATE BOARD OF MEDICAL REGISTRATION AND EXAMINATION.

ANATOMY AND HISTOLOGY.

1. Locate the brachial plexus and its branches, naming the latter.
2. Describe the medulla oblongata.
3. Locate and describe a femoral hernia and name its coverings, beginning with the surface.
4. Describe the intestinal tract and name its divisions.
5. Locate and describe the omentum, giving the histology of the same.
6. Describe the valvulæ conniventes.
7. Locate and describe the pancreas, giving its histology.
8. Give the histology of the arteries. Does it differ from the histology of the veins? If so, how?
9. Describe the sympathetic nerve, naming its divisions, and number of ganglia in each.
10. How many bones are there in the human skeleton?

CHEMISTRY AND TOXICOLOGY.

1. What is galvanism?
2. How can it be demonstrated that hydrogen is lighter than air?
3. What is analysis and what is synthesis?
4. What is the effect of inhaling air rich with ozone on the respiratory organs?
5. In what manner does arsenic prove poisonous?
6. How does CO act as a poison?
7. What is the action of KOH on the tissues?
8. What is the antidote for acute poisoning by $HgCl_2$?
9. What is the reaction of blood during gout?

10. What is Trommer's test for sugar in urine?

OBSTETRICS.

1. Write a page on deformities of the pelvis.
2. What would you do in a case of postpartum hemorrhage?
3. How would you treat a case of hour-glass contraction?
4. Write a page on puerperal eclampsia.
5. How would you treat a case of pelvic cellulitis?
6. Into how many stages is labor divided?
7. How would you treat a case of face presentation?
8. How would you treat a case of adherent membranes?
9. Write a page on the use of the forceps.
10. How would you treat fibroid tumors of the uterus?

PATHOLOGY.

1. Define gangrene.
2. What is a sarcomatous tumor? Give its pathology.
3. Define chronic gastritis and give its pathology.
4. Give symptoms, etiology, pathology, diagnosis and prognosis of herpes zoster.
5. Give symptoms, etiology, and prognosis of erysipelas.
6. Give etiology, symptoms, diagnosis, and prognosis of neuritis (multiple).
7. Define lithemia.
8. Define purpura hæmorrhagica.
9. Give differential diagnosis of septicemia and pyemia.
10. Describe the pathology of rachitis.

BACTERIOLOGY.

1. How do bacteria multiply?
2. What is essential to the life of bacteria?
3. Name and describe the malarial parasites.
4. What disease does the bite of an infected *Stegomyia fasciata* produce?
5. Name five culture media.
6. Name and describe the pus-producing germs.
7. Describe Widal's test for typhoid fever.
8. What are leucocytes, and what occurs when they come in contact with pathogenic bacteria?
9. What are ptomaines and toxins?
10. What are sterilization, antiseptics, disinfectants, and germicides?

PHYSIOLOGY.

1. What are the functions of the spinal cord?
2. What is the origin of urea and of uric acid?
3. (a) Describe the vasomotor nervous system and

explain its functions. (b) Where is the vasomotor center located?

4. (a) Give the function of the suprarenal glands. (b) What is result of their extirpation?

5. What kind of membrane lines the mastoid cells, and why?

6. Explain the portal circulation.

7. (a) What are the functions of bile? (b) Give its constituents.

8. Describe the pleuræ, giving kind of tissue and functions.

9. (a) Give functions of the cerebellum. (b) What is the result of its extirpation?

10. Give the functions of the medulla oblongata. (a) Name the "centers" located in the bulb.

SURGERY.

1. What class of patients take ether better than chloroform, and why? What class take chloroform better, and why?

2. What are the signals of danger in general anesthesia?

3. How would you treat a suppurating cavity of the thorax?

4. What is the proper surgical treatment of a chronic varicose ulcer of the leg? Give details.

5. What is osteoplasty, and in what part of the body is it most frequently called for? Give an example.

6. Give the cause and treatment of *painful* cicatrix, *adherent* cicatrix, *contracted* cicatrix, and *exuberant* cicatrix.

7. What kinds of tumors are most safely removed? What kinds are the least safely removed?

8. How would you treat an ingrowing toenail? Give full details.

9. What is the best surgical treatment for hemorrhoids? Give details.

10. What bone in the body is frequently fractured and is the most difficult of all bones to reunite by bony union? How should it be treated when fractured? Give details.

OPHTHALMOLOGY, OTOLOGY, RHINOLOGY, AND MEDICAL JURISPRUDENCE.

1. Name some causes of ozena.

2. Discuss the pathological characteristics of nasopharyngeal adenoids.

3. Define strabismus. What causes it?

4. Describe the crystalline lens and give its relations.

5. The vast majority of all the diseases of the ear have their origin in inflammations of what particular membrane?

6. Prescribe for chronic case of otitis media purulenta.

7. Nasal polypi—give diagnosis and surgical treatment.
8. What do you understand by medical jurisprudence?
9. What constitutes a dying statement, and what conditions are necessary to make it admissible as evidence in a court of justice?
10. Give diagnostic symptoms between diphtheria and follicular tonsillitis.

THEORY AND PRACTICE.

1. Write a page on epidemics.
2. Write a page on the treatment of typhoid fever.
3. Give diagnosis and treatment of scarlet fever.
4. Give treatment of erysipelas.
5. Give diagnosis and treatment of rickets.
6. Give diagnosis and treatment of acute laryngitis.
7. Write a page on pneumonia.
8. Describe the different murmurs of the heart and tell what they indicate.
9. Give treatment for acute peritonitis.
10. Write a page on Bright's disease.

MATERIA MEDICA.

1. In what disease is opium used principally?
2. Name the excitomotors.
3. What are the preparations and doses of conium?
4. Is ether ever used as a cardiac stimulant?
5. How should poisoning by digitalis be treated?
6. What are the medicinal uses of ipecac?
7. What substances are incompatible with belladonna?
8. What are the effects, uses, and doses of calcium chloride?
9. What are the preparations and doses of gold salts?
10. Name the mineral tonics.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

KANSAS STATE BOARD OF MEDICAL REGISTRATION AND EXAMINATION.

ANATOMY.

1. The *brachial plexus* is formed by the union and subsequent division of the anterior divisions of the fifth, sixth, seventh, and eighth cervical and the first dorsal nerves. The union of the fifth and sixth makes the upper trunk; the seventh forms the middle trunk, and the eighth cervical and first dorsal make the lower trunk. Each of these trunks is divided into an anterior and a posterior branch. The

anterior branches, from the upper and middle trunks, make the upper or outer cord of the plexus; the anterior branch of the lower trunk becomes the lower or inner cord; the thee posterior branches unite to form the posterior or middle cord. The plexus lies between the Scalenus anticus and medius. The *branches* are: (1) Above the clavicle; communicating, muscular, posterior thoracic, and suprascapular. (2) *From outer cord:* External anterior thoracic, musculocutaneous, and outer head of median. (3) *From inner cord:* Internal anterior thoracic, lesser internal cutaneous, ulnar, and inner head of median. (4) *From posterior cord:* Subscapular, circumflex, and musculospiral.

2. The *medulla oblongata* is the lowest part of the encephalon, and is continuous below with the spinal cord. It extends from the lower margin of the pons to the lower margin of the foramen magnum. It lies in the basilar groove of the occipital bone; its dorsal surface is between the cerebellar hemispheres. It forms the lower part of the floor of the fourth ventricle. It is about one inch long, half inch wide, and half inch thick. It has anterior and posterior median fissures, which are continuous with those of the spinal cord.

3. A *femoral hernia* is one which descends from the abdominal cavity through the femoral canal. From without, inward, it is covered by: Skin, superficial fascia, cribiform fascia, crural sheath, septum crurale, subserous areolar tissue, and peritoneum.

4. *The divisions of the intestinal tract* are: Mouth, teeth, tongue, salivary glands (parotid, sublingual, and submaxillary), pharynx, esophagus, stomach, small intestine (duodenum, jejunum, and ileum), large intestine (cecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid flexure, and rectum).

5. The *omentum* is a peritoneal fold connected with the stomach. There are three omenta.

Small or gastrohepatic omentum. From transverse fissure of liver to small curvature of stomach and 1st part of duodenum. Right border free, forming anterior boundary of foramen of Winslow.

Large or gastrocolic omentum. Formed by the passing downward and then folding upward of the two layers passing from stomach, and thus encloses the lower part of the cavity of the smaller sac of the peritoneum.

Gastrosplenic omentum. Passes from great cul-de-sac of stomach to hilum of spleen, and contains the splenic vessels between its layers. Below it is continuous with the large omentum.

6. The *valvulæ conniventes* are crescentic folds of the mucous membrane found in the small intestine (chiefly in the duodenum and first part of the jejunum). Each

fold extends about two-thirds of the way round the lumen of the intestine, and increases the surface.

7. The *Pancreas. Length:* 6 to 8 inches. Consists of a body, enlarged to the right at its head, with which the body is connected by a narrow part or neck, and narrowed to the left, where it ends as the tail.

Position: Placed in the epigastric and both hypochondriac regions, directed transversely across posterior wall of abdomen.

Relations of the body:

In front. Stomach and small omentum.

Behind. Aorta, crura of diaphragm, splenic vein, left kidney, left suprarenal body and left renal vessels.

Upper border. From right to left; celiac axis, splenic artery.

Lower surface. From right to left; superior mesenteric vessels, inferior mesenteric vein, transverse colon.

Left end or tail. Touches lower part of anterior surface of spleen.

Right end or head. Embraced by three parts of duodenum, from which it is partly separated, behind by bile-duct, and in front by pancreatico-duodenal arteries. Is covered in front by the lesser sac of peritoneum.

Behind it lies on the 1st and 2nd lumbar vertebræ, from which it is separated by the crura of the diaphragm, inferior vena cava, superior mesenteric vessels, and portal vein. The superior mesenteric vessels overlap the left end of the head, lying in a groove on this surface.

Duct (canal of Wirsung); extends transversely from left to right, opens into 2nd part of the duodenum in common with the ductus communis choledochus.

Arteries: Pancreatic of splenic, superior, pancreatico-duodenal of hepatic, and inferior pancreatico-duodenal of superior mesenteric.

Veins: Open into splenic and superior mesenteric.

Nerves: From the solar plexus.

The pancreas consists for the most part of long tubular acini of columnar or polygonal epithelial cells, supported by very loose fibrous tissue. The cells are of the serum-secreting type. Their inner portion shows granules; the outer part is clearer, and sometimes striped. The pancreas has therefore a general resemblance to the parotid gland, but differs from it in two respects: (1) The intralobular ducts are lined by flat epithelium, and are inconspicuous; (2) between the acini here and there are islands of epithelial cells without any glandular arrangement. These are the *islets of Langerhans.* In some of the acini, close to the lumen, stellate cells can be seen. These are the *centro-acinar cells of Langerhans,* and are probably continued into the acini from the small ducts. There are spaces be-

tween the cells continuous with the lumen of the acini. The larger ducts are lined with columnar epithelium, with a few goblet cells here and there, and the largest ducts have a ring of non-striped muscle in the fibrous wall.

Numerous nerve fibers with nerve cells in their course run through the pancreas and end among the cells. Some of them may terminate in Pacinian corpuscles.—(*Aids to Anatomy and Histology.)*

8. An *artery* consists of three coats: The tunica interna, or internal coat; the tunica media, or middle coat, and the tunica adventitia, or external coat. The internal coat consists of a basement membrane, on which is a layer of endothelial cells. The middle coat consists of involuntary muscle fibers, between the layers of which are some elastic fibers. The external coat consists of connective tissue (white fibrous and yellow elastic). Between the two outer coats is an elastic membrane.

The *veins* also have three coats, but the external coat is thicker than the middle coat (the opposite condition prevails in the arteries); the veins often have valves.

9. "*The sympathetic nervous system consists of* (1) a series of ganglia connected together by a great ganglionic cord, the gangliated cord, extending from the base of the skull to the coccyx, one gangliated cord on each side of the middle line of the body, partly in front and partly on each side of the vertebral column; (2) of three great gangliated plexuses or aggregations of nerves and ganglia, situated in front of the spine in the thoracic, abdominal, and pelvic cavities respectively; (3) of smaller or terminal ganglia, situated in relation with the abdominal viscera; and (4) of numerous fibers."

The cervical division has three pairs of ganglia; the dorsal, twelve pairs; the lumbar, four pairs; and the sacral four or five pairs.

10. There are 206 named bones in the human skeleton.

CHEMISTRY AND TOXICOLOGY.

1. By the term Galvanism is meant current electricity derived from chemical action, in opposition to that produced by heat or induction. The term is no longer used scientifically; but is laxly employed to denote the constant current as distinguished from the induced current (which is sometimes called Faradism or Faradization).

2. Soap-bubbles or a toy balloon, if filled with hydrogen gas, will rise rapidly in the air.

3. *Analysis* is the splitting up of a compound into its elements or into simpler compounds. *Synthesis* is the building up of a compound from elements or from simpler compounds.

4. It causes severe coryza and hemoptysis.

5. By the ingestion of flypaper, or the water in which it has been placed, poisoning by *elementary arsenic* may be caused. By the inhalation of hydrogen made from zinc and sulphuric acid containing arsenic, poisoning by *Arsin* may be produced. *Arsenic trioxide* can cause poisoning by being absorbed from the mouth, stomach, rectum, vagina, or urethra; or by absorption from the skin in the use of parasiticides or cancer cures containing arsenic; also by inhalation of dust from wallpapers containing arsenic; from clothes dyed with arsenic; and by the ingestion of rat poisons, etc.

6. By uniting with the hemoglobin of the blood and forming a more stable compound than oxyhemoglobin. In this way the power of the red corpuscles to carry oxygen from the air to the tissues is destroyed; and asphyxia is thus produced.

7. It acts as a caustic on living tissues; and disintegrates all tissues, whether dead or alive.

8. White of egg, in not too large a quantity, and followed by an emetic.

9. Alkaline; but the degree of alkalinity may be lowered, and uric acid crystals may be found in the blood.

10. Place in a test tube some urine free from albumin; add a few drops of a solution of cupric sulphate, and then some liquor potassæ (about half as much as the urine); shake and boil. A yellow or red precipitate is formed in the presence of sugar.

OBSTETRICS.

1. Varieties of deformed pelvis are: Flattened pelvis, generally contracted pelvis, symmetrically enlarged pelvis, juvenile pelvis, masculine pelvis, malacosteon pelvis, oblique deformity of Naegele, Robert's pelvis, spondylolisthetic pelvis, kyphotic pelvis, scoliotic pelvis, split pelvis. *General symptoms:* "Previous history of difficult labors, and of the diseases or accidents by which pelvic deformity is produced; shortness of stature, spinal curvature, pendulous belly, lameness, increased obliquity, and mobility of the uterus. *Moderate* pelvic contraction can occur without these symptoms. Since a contracted brim will not admit the head, the latter is movable above the brim, when it ought to have become fixed by descent. On vaginal examination the sacral promontory is more easily reached; the finger can pass more easily between the ring of the os uteri and bag of waters; the latter protrudes during a pain, perhaps in a finger-glove form. The presenting part is high up when brim is contracted. Intense pains produce no proportionate descent of presenting part, the latter becomes *"arrested"* when there is partial descent; or later on *"impacted"* (when it cannot be moved up or down). Unusually large caput

succedaneum; its gradual swelling may be mistaken for progress in descent. Liability to malpresentations and to presentations of funis."—(King's *Obstetrics.*)

2. *In postpartum hemorrhage:* Grasp the uterus at once, through the abdominal wall, and massage it firmly. Anything in the uterus should at once be cleaned out. Pass one hand into the uterus, and with the other on the outside make firm pressure. A hypodermic of ergotin, or ergot can be given by an assistant. An intrauterine douche of hot sterilized water (about 115° F.) may be given. Sometimes a very thorough packing and plugging of gauze of uterus and vagina may be necessary. Whatever is done must be done promptly; and everything likely to be needed for this emergency should be prepared beforehand in every labor.

3. First, give a hypodermic of morphine and atropine, or a dose of chloral or an anesthetic, and then, with one hand in the vagina, gently introduce the index and middle fingers into the uterus and through the constricting band. After a time the resistance of the constriction will be thus overcome. By pressing the uterus downward, the fingers and the border of the placenta are brought in contact. Effort is then made to bring part of the placental mass through the constriction; the placenta being removed as in case of adherent placenta.

4. PUERPERAL ECLAMPSIA is an acute morbid condition, occurring during pregnancy, labor, or the puerperal state, and is characterized by tonic and clonic convulsions, which affect first the voluntary and then the involuntary muscles; there is total loss of consciousness, which tends either to coma or to sleep, and the condition may terminate in recovery or death. *Etiology:* Uremia, albuminuria, imperfect elimination of carbon dioxide by the lungs, medicinal poisons, septic infection; predisposing causes are renal disease and imperfect elimination by the skin, bowels, and kidneys. *Symptoms:* Headache, nausea, and vomiting, epigastric pain, vertigo, ringing in the ears, flashes of light or darkness, double vision, blindness, deafness, mental disturbance, defective memory, somnolence; symptoms easily explained by the circulation of toxic blood through the nerve centers. These may be preceded by lassitude, and accompanied by constipation, or by diarrhea. Headache is perhaps the most significant and common warning symptom. In bad cases the urine is reduced in quantity (almost suppressed), very dark in color, its albumin greatly increased, so that it becomes solid on boiling. Next comes the final catastrophe of convulsions. The convulsive fit begins with twitching of the facial muscles, rolling and fixation of the eyeballs, puckering of the lips, fixation of the jaws, protrusion of the tongue, etc., soon followed by violent spasms of the muscles of the trunk and limbs, including those of

respiration; hence lividity of the face and stertorous breathing, biting of the tongue, opisthotonus, etc. The fit lasts fifteen or twenty seconds, ending in partial or complete coma, possibly death; or consciousness may return, to be followed by other convulsions. For *preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. The *curative treatment* includes: (1) Controlling the convulsions (by chloroform, veratrum, or chloral); (2) elimination of the poison or poisons which are presumed to cause the convulsions; (3) emptying the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

5. The vagina should be made as aseptic as possible, by means of vaginal douches of bichloride of mercury 1:2,000. The vaginal vault and the cervix uteri can then be painted with tincture of iodine; sometimes the insertion of a vaginal suppository containing about thirty grains of iodoform is of benefit. In case suppuration occurs, the abscess should be opened; if it bursts into the rectum or vagina, measures must be instituted for drainage and disinfection. Very frequently an abdominal operation is necessary. Antipyretics should be given for the fever; and for the pain cold compresses or ice bags should be applied to the perineum and lower part of the abdomen.

6. Labor is divided into three stages: (1) The *first* begins with the onset of labor, and lasts till the os is completely dilated; (2) the *second* begins with the complete dilation of the os and ends with the complete expulsion of the child; (3) the *third* ends with the complete expulsion of the placenta and membranes.

7. If the chin is presenting anteriorly, expectant treatment may suffice; but care must be taken to observe that the chin does not rotate backwards. Spontaneous version may occur, and the presentation become a vertex one. Failing this, or as a means of favoring this, postural treatment, such as Walcher's position, has been recommended. If, in spite of this, engagement has not occurred, cephalic version is indicated, care being taken not to rupture the membranes If this is not successful, podalic version should be tried. If, after all these manipulations, the child is still alive and the head is engaged, symphyseotomy is indicated; if the child is dead, craniotomy should be performed.

8. To *remove adherent membranes.* The hand should be

passed into the uterus, and a detached edge of membranes found, and gently separated with the finger tips; at the same time the fundus should be stimulated by friction through the abdominal walls.

9. *Forceps.* "The Simpson, the Tarnier axis-traction, and the Sawyer forceps are the instruments most often used. They may be used as tractors, rotators, levers, or compressors. They are indicated when there are lessened expulsive force, increased resistance, threatened fetal or maternal life, certain acute and chronic diseases, and abnormal positions and presentations. They should not be used when the os is undilated, when the head is not engaged, except in placenta prævia, when the membranes are unruptured, when the disproportion between the child's head and the parturient canal is too great, or in impossible positions and presentations. Before applying the instruments they should be sterilized, perferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the vulva; the tip is introduced into the vagina, passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades must be rotated forward. If the head occupies the right oblique diameter, as in L. O. A. and R. O. P. positions, the right blade must be rotated; if it occupies the left oblique diameter, the left blade must be rotated. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps. In posterior positions it is necessary to remove the instruments after the head is drawn down to the pelvic floor; after anterior rotation is secured they may be reapplied. If the occiput rotates into the hollow of the sacrum the hands should be depressed as the face is swept out under the symphysis pubis."—(*Pocket Cyclopedia.*)

10. Fibroid tumors of the uterus may be treated by ergot, electricity, or by operation. This last includes vaginal and abdominal methods, enucleation, myomectomy, and hysterectomy.

PATHOLOGY.

1. Gangrene is the complete and permanent loss of vitality in a considerable area of tissue.

2. A sarcomatous tumor is one arising from connective tissue, with excessive cell formation and very little intercel-

lular substance. The cells are either embryonic or imperfectly developed connective tissue cells. Sarcomata are always mesoblastic in origin; their blood supply is abundant, and it is through this channel that they are disseminated; of their lymphatics and nerve supply nothing is known. In gross appearance sarcomata are of a more or less homogeneous nature, the color depending upon the quantity of blood present; occasionally a milky fluid can be expressed, but there is never anything corresponding to the "cancer-juice" of carcinomata. Sarcomata may undergo various secondary changes, such as fatty degeneration, hemorrhages, and mucoid softening. Sarcomata are malignant, hence they have a tendency to spread to distant organs (metastasis), are heterologous, have no definite limiting capsule, tend to infiltrate the surrounding tissues, tend to recur after removal, and cause cachexia and death. They have been classified in a variety of ways: (1) according to the *cells*, as round cell sarcoma, spindle cell sarcoma, giant cell sarcoma, mixed cell sarcoma; (2) according to the *stroma*, as fibrosarcoma, myxosarcoma, chondrosarcoma, osteosarcoma; and (3) according to *secondary changes*, as melanosarcoma, liposarcoma, chloroma.

3. *Chronic gastritis* is a chronic inflammation of the stomach. The stomach is enlarged, all its coats may be thickened, there is much mucus and numerous ecchymoses. the mucous membrane is wrinkled, the glands are enlarged and saccular, the gland cells may be degenerated or atrophied.

4. *Herpes zoster* is an acute inflammatory affection characterized by the formation of grouped vesicles along the line of a cutaneous nerve, and accompanied by neuralgic pains. It is usually associated with some neurotic disturbance, and is caused by atmospheric changes, exposure to cold and wet, traumatism to the nerves, and the long-continued use of arsenic. The disease is self-limited, most frequently unilateral, and seldom recurs. The pathology is uncertain; the spinal ganglia may be inflamed, or there may be a peripheral neuritis.

5. *Erysipelas* is caused by the streptococcus erysipelatis. Symptoms are chill; high fever; red, swollen mass, with clearly defined edges, itching, burning, and having a tendency to spread. Prognosis is good except in infants and puerperal women.

6. *Multiple neuritis* is a parenchymatous inflammation of a number of symmetric nerves, simultaneously or in rapid succession; characterized by pain, numbness, loss of power, ataxia, with muscular atrophy, and often various mental symptoms. It may be due to alcoholism, syphilis, malaria, lead, arsenic, silver, diphtheria, typhoid fever, rheumatism, or beriberi and kakke. The affection may be

acute or chronic. The acute form is characterized by chill, fever, pain, numbness, and tingling in the affected parts, paralysis, and death. The chronic form is most frequent and is manifested by pains in the diseased parts, alterations in sensation and motion, tenderness, wasting, abolition of deep reflexes, etc. The distinctive features of this affection are symmetric localization of the sensory and motor symptoms, and tenderness of the skin, nerve-trunks, and muscles. The likelihood of cure is greater in the early stages and in the sensory form of the disease."—(*Pocket Cyclopedia.*)

7. *Lithemia* is a condition due to imperfect metabolism, and is characterized by an accumulation of uric acid or urates in the blood. It differs from gout in the absence of joint involvement.

8. *Purpura Hæmorrhagica* is a disease of unknown origin, and is characterized by hemorrhages into the skin and mucous and serous membranes, and usually runs a rapid and fatal course.

9. *Septicemia* begins with a rigor, followed by a rise of temperature up to about 104° F., which remains constant. The pulse is weak and progressively rapid; there is anorexia and constipation, which is followed by diarrhea; the urine contains albumin; the temperature may become subnormal. There are no repeated rigors and no secondary (metastatic) abscesses. *Pyemia* begins with a rigor, which may last for half an hour, and is repeated every one or two days. The temperature rises as in septicemia, but rapidly falls, and at the same time the patient suffers a profuse perspiration. The pulse is weak and rapid; there is anorexia; and there may be delirium, with jaundice and signs of abscesses in the lungs, joints, etc. In pyemia there are repeated rigors and secondary abscesses.

10. *Rachitis.* There is a deficiency of lime in the bones: the peristeum and cartilage are hyperemic; ossification is defective; craniotabes and open fontanels are present: there are bead-like prominences over the ribs; pigeon breast and prominent abdomen are noticed; the epiphyses are enlarged, and the tibiæ are bent.

BACTERIOLOGY.

1. Bacteria multiply by fission and by sporulation.

2. Most bacteria require (1) proper temperature, generally at or near that of the body; (2) oxygen is generally needed, those that cannot live without it being called aërobic, and those that can grow without it, anaërobic; (3) nutriment of a proper kind, containing both organic and inorganic material; (4) a slight degree of moisture; (5) a medium of slightly alkaline reaction; and (6) rest. Individual bacteria may require modifications of the above essentials.

3. *Malarial plasmodium.* "Parasite, one-celled, one stage of its life in mosquito (anopheles) and by it inoculated upon man. In the body of man occurs as ameba with active motion, or as long crescents usually motionless except pulsation; both present hyaline protoplasm and a diffuse or distributed nucleus.

Ameboid form; pale structureless disks in red-blood cell; inclose pigment granules as they increase in size, show ameboid movement till large adult fully pigmented stage is reached, while red cell changes in shape, size and color. Reproductive stage follows, the ameba quiet, pigment collects at center, rarely periphery (presegmenting form), delicate radii appear splitting ameba into segmenting forms (rosette) commonly 18 in number, disposed about a dark unsegmented residuum; corpuscle breaks and sets segments free as small roundish or oval spores each with a central refracting nucleus; these reënter red cells and repeat the cycle, which is thus equivalent to continuous self-inoculation of the host. Fever paroxysm and breaking up of rosette coincide. The second form of the organism which secures its existence outside of the human body (exogenous cycle) is produced by conjugation of a single flagellum of the "male" flagellate form with a large, pale, non-ameboid "female." Three forms are recognized: Tertian, quartan, and estivo-autumnal."—(Thayer's *Pathology.*)

4. *Yellow fever.*

5. *Gelatin,* agar, potato, bouillon, and blood-serum.

6. *The pus-producing bacteria are*: staphylococcus pyogenes aureus, staphylococcus pyogenes albus, staphylococcus pyogenes citreus, staphylococcus cereus aureus, staphylococcus cereus albus, staphylococcus cereus flavus; streptococcus pyogenes; micrococcus tetragenus, micrococcus pyogenes tenuis; gonococcus; pneumococcus; bacillus pyocyaneus, bacillus typhosus, and bacillus tuberculosis.

7. The *Widal test:* "Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps, and cease their rapid

movement inside of twenty minutes."—(From Thayer's *Pathology.*)

8. *Leucocytes* are white blood corpuscles. When they come in contact with pathogenic bacteria, if the conditions are favorable, they devour and destroy the bacteria (phagocytosis); sometimes, however, the bacteria manage to destroy the leucocytes.

9. *Ptomaines* are the putrefactive products of dead animal tissues or fluids.

Toxins are the products of pathogenic bacteria or of ptomaines or leucomaines, and are actively poisonous.

10. *Sterilization* is the process of freeing a substance from the live bacteria that may be on it or in it.

Antiseptics are agents which prevent or restrain putrefaction.

Disinfectants are agents which restrain infectious diseases by destroying or removing their specific poisons.

Germicides are agents whch destroy bacteria and their germs.

PHYSIOLOGY.

1. The functions of the spinal cord are: (1) the conduction of nerve impulses; (2) reflex action; (3) coördination;; it also contains special centers which preside over definite functions.

2. *Urea* is derived from the nitrogenous food ingested; it is manufactured by the cells of the liver.

Uric acid: "In man uric acid has a twofold origin; one portion, coming from the breaking down of the nuclein-containing tissues or cell elements of the man's own body, and hence is of endogenous origin, while the other portion —usually the larger—is of exogenous origin, coming from the transformation of free and combined purin compounds present in the food."—(Chittenden.)

3. The vasomotor nervous system consists of (1) a vasomotor center in the bulb, (2) of some subsidiary centers in the spinal cord, and (3) of vasomotor nerves, which are of two kinds: (*a*) those causing constriction of the vessels, and so-called vasoconstrictor nerves; and (*b*) those causing dilatation of the vessels, and so-called vasodilator nerves. These nerves supply the muscle tissue in the walls of the blood-vessels and regulate their caliber, thus influencing the *quantity* of blood supplied to a part; at the same time they regulate the *quality* of blood supplied to a part; they also regulate the *nutrition* of a part, also *secretion* and *heat production.* They are concerned, too, in the control of the heart-beat. The center is in the medulla, in the floor of the fourth ventricle, near the calamus scriptorius.

4. The function of the suprarenal glands is unknown;

it is supposed that they are able to destroy or remove some toxic substance produced elsewhere in the body. Removal of these glands is rapidly followed by death.

5. The mastoid cells are lined by epithelium, continuous with that of the tympanic cavity.

6. *Portal circulation:* "The hepatic artery and the portal vein convey blood to the liver. The artery carries arterial blood, and the vein food-laden venous blood from the walls of the alimentary canal, and from the spleen and pancreas. Both vessels enter the liver at the transverse fissure, and they ramify in its interior, breaking up into small terminal branches which run between the lobules and send fine capillary branches into their substance; from these latter branches the blood passes into the capillary tributaries of the intralobular veins, thence to the sublobular veins, and from the sublobular veins to the hepatic veins, which terminate on the posterior surface of the liver in the inferior vena cava."—(Bain's *Medical Practice.*)

7. The functions of the bile are: (1) to assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach, and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action.

The constituents of the bile may be shown in the following table, which presents the averages of three analyses given by Hammarsten; the results are given in parts per thousand:

Water	971.380
Solids	28.620
Mucin and pigments	4.910
Bile salts	12.197
Taurocholate	2.431
Glycocholate	9.766
Fatty acids from soaps	1.243
Cholesterin	1.200
Lecithin and fats	0.970
Soluble salts	7.360
Insoluble salts	0.317

8. *Pleuræ.* The pleura is a serous membrane which covers the lung, *pleura pulmonalis* or *serous layer of the pleura,* being at its root reflected so as to line the thorax, forming the *pleura costalis* or *parietal layer of the pleura.* The theoretical space between the two layers is the *pleural cavity.* Inasmuch as these layers are normally always in

contact, there is no actual space or cavity between them, although they are moistened by a small amount of secretion for lubricating purposes. Its *structure* is that of a serous membrane; it consists of squamous epithelial cells on a basement membrane.

Function of pleuræ. With the pleural fluid, to prevent friction in the movements of the lungs.

9. The functions of the cerebellum are: (1) coordination, (2) equilibrium. Removal of the cerebellum causes loss of these functions.

10. The functions of the medulla are: (1) Conduction of nerve impulses and impressions, (2) as an independent reflex center.

The "centers" located in the bulb are: (1) center for mastication, (2) for secretion of saliva, (3) for sucking, (4) for deglutition, (5) for vomiting, (6) for voice, (7) center for expression, (8) cardiac centers, (9) respiratory centers, (10) vasomotor centers.

SURGERY.

1. The following contraindications for ether and chloroform are from Hare's *Practical Therapeutics:* "Ether should not be used by inhalation in bronchitis or acute nephritis, because of its irritant properties; in peritonitis or gastritis, because it is apt to induce vomiting; in aneurysm or in the presence of marked vascular atheroma, because it may rupture a blood-vessel by raising arterial pressure; nor in diabetes, lest it produce diabetic coma; and if anemia is present and an examination of the blood shows that the hemoglobin is below 50 per cent. the use of the drug should be avoided if possible.

"*Chloroform* is not to be used in cases of fatty heart or dilatation of the heart, in those with a known idiosyncrasy, nor in the so-called lymphatic persons with overgrowth of lymphoid tissues, as, for example, adenoids. In the latter case it is particularly apt to cause sudden death. In valvular disease of the heart chloroform may be used with caution, although ether is preferable. Given a case of valvular disease that must be subjected to operation, the chances are bettered with an anesthetic than without it, as the pain and mental shock are worse for the heart than is the anesthetic."

2. The danger signals are: (1) Lividity or extreme pallor of the face, (2) feeble, irregular, or intermittent pulse, (3) slow and shallow respiration, (4) dilatation of the pupils during deep narcosis.

3. Aspirate, irrigate, resect rib or chest wall, and drain.

4. *Treatment of varicose ulcer* consists in disinfection of the ulcer by continued application of weak antiseptic dressings, frequently renewed before they are saturated with

discharge, or of a continuous antiseptic bath; of application of oxygen, or exposure to filtered air; of firm pressure on the superficial veins above and below, with Martin's or other bandage; of operations on the affected veins to relieve congestive pressure, with careful precautions to prevent infection entering them; of strapping to keep the edges of the skin from dragging and to favor the spread of epithelium, care being taken that no discharge is allowed to accumulate beneath it, by using a perforated strapping and very frequent changes.

5. By *osteoplasty* is meant the transplanatation of bone (with periosteum). It is most frequently performed on the skull.

6. ***Painful cicatrix*** is caused by the pressure of a contracting cicatrix upon the cut end of a nerve or by the inclusion of a nerve in the scar of an amputation stump. In the former case the painful part should be excised; in the latter the stump must be opened and the end of the affected nerve removed.

Adherent cicatrix is caused by simultaneous injury (such as burns or scalds) to contiguous and approximated parts, such as the fingers, or the pinna and the side of the head. A plastic operation is indicated.

Contracted cicatrix is most apt to occur in the flexure of a joint; a serious burn of the hand may cause flexion-contracture of the fingers. The treatment is to divide the cicatrix, dissect out the scar, and follow with skin-grafting.

Exuberant cicatrix consists of a hyperplasia of scar tissue, it is most often found in tuberculous patients, and is of unknown etiology. Excision is useless, as it is very apt to recur. Sometimes it disappears spontaneously.

7. Benign tumors are most safely removed; and malignant tumors are least safely removed.

8. *Ingrowing toenail:* "The essential point is to remove both the edge of the nail and that portion of the matrix from which it grows. The following operation will be found satisfactory: Sterilize the toe as completely as possible and tie a rubber band around its base; inject a few drops of a eucaine or stovaine solution along the edge of the nail and beneath it as far back as the second phalanx. Make an incision through the nail and overlying skin and matrix in about one-fourth of an inch from the edge of the nail. The overlying skin is next dissected free from the edge of the nail and its matrix. The portion of the nail marked out by the first incision is then dissected out with its matrix, care being taken that all of the matrix corresponding to the nail is removed. The wound is irrigated with a 1 to 2,000 bichloride solution and closed by wrapping a gauze dressing around the toe and securing it by a bandage firmly applied. The rubber bandage is next

removed. The wet dressing should be renewed daily for a few days, and after this time a dry dressing may be employed."—(Wharton's *Minor Surgery.*)

9. Clamp and cautery. *Radical treatment* is advisable when there is much pain and bleeding. It must be ascertained first that the piles are not due to disease elsewhere, as cirrhosis or stricture, or to pregnancy. The bowels are emptied, and the patient is placed in the lithotomy position The sphincter is then dilated with two thumbs, to expose the piles, which are caught up with ring forceps. A clamp is applied to the piles in turn, and they are removed by the cautery. The bowels are kept confined for five or six days, when castor-oil is given. Very little pain and no bleeding follow this operation. Removal can be done by snipping the mucous membrane around the pile and ligaturing its base. Crushing is also done.—(*Aids to Surgery.*)

10. The patella. It is best treated by open operation and wiring.

"The open operation must necessarily be aseptic. The knee may be washed out with 1 in 40 carbolic or 1 in 2,000 perchloride without injury, or sterilized saline solution may be used. The joint is opened by a horseshoe incision, the blood-clot is removed, the aponeurosis clipped away, the bones drilled and fixed in accurate apposition with silver wire, and the wound is closed without drainage. As atrophy of the quadriceps occurs early, massage and passive movements must be begun in ten days. The patient may go about on crutches in three weeks. Bony union is firm in six weeks."—(*Aid to Surgery.*)

OPHTHALMOLOGY, OTOLOGY, RHINOLOGY, AND MEDICAL JURISPRUDENCE.

1. (1) Atrophic nasal catarrh, due to syphilis, glanders, caries, or necrosis of the nasal bones; (2) ulcers of a syphilitic, lupoid, or tuberculous origin; (3) foreign bodies and new growths in the nose or nasopharynx.

2. Adenoids consist of lymphoid tissue, which is composed of masses of round cells held together by connective tissue. Mucous glands may be found in the deeper parts of the lymphoid tissue; and the whole is covered with ciliated columnar epithelium.

3. Strabismus, or squint, is a condition in which the lines of sight of the two eyes are not directed towards the same object of vision.

The *causes* are: (1) disturbances of equilibrium of the ocular muscles; (2) errors of refraction; (3) opacities in the cornea or lens; (4) intraocular disease.

4. The crystalline lens is a transparent double convex body enclosed in a transparent membrane, the lens capsule. It is in contact anteriorly with the iris; posteriorly it rests

in a depression in the vitreous body, and it is surrounded by the suspensory ligament or zonule of Zinn. It is about 1/3 inch in diameter, and about 1/5 inch thick.

The lens capsule is the structureless membrane enclosing the lens, thick in front near its circumference, where it is strengthened by the fibers of the zonule, but very thin posteriorly.

5. The membrana tympani.

6. ℞. Acidi borici ..... gr. xxx
Zinci sulphatis ..... gr. xvj
Glycerin ..... ʒij
Aquæ distillatæ..... ʒij. M.

Sig. A few drops to be instilled into the ear several times a day.

7. NASAL POLYPI. These are of two different origins: (1) Inflammatory, and (2) neoplastic.

1. *Mucous polypi* are merely edematous granulations hanging from the surface of a diseased ethmoid bone, which is affected by rarefying ostitis or caries. They occur in young adults, and cause nasal obstruction, often bilateral. Grow from the middle and superior turbinate bones. They frequently undergo cystic degeneration from the development of cysts in the glands of the mucous membrane covering them. After local removal they recur within a few months.

Treatment: (*a*) Removal by wire snare under cocaine. (*b*) Usually a thorough erasion of the lateral mass of the ethmoid or the opening of a suppurating sinus is required, so as to remove the diseased bone.

2. *Fibrous and sarcomatous polypi.*—Consist in all gradations between fibromata and sarcomata, usually beginning as the former and ending as the latter. Occur in children and adolescents most commonly. Grow from the base of the skull and occupy the nasopharynx. Cause nasal obstruction with sanious discharge. *Pressure signs* may be: (1) Pushing down the velum palati and causing asphyxia; (2) expanding the nasal cavities and producing a widening of the nasal bridge; (3) pressing the eyeballs outward; (4) extending into the base of the brain. *When they are malignant,* secondary growth may occur in the lymph glands of the neck. In these cases the primary growth is probably a lymphosarcoma of the pharyngeal tonsils.

Treatment is only possible in the early stages. (1) Removal by a snare through the anterior nares; (2) removal through the mouth after splitting the soft palate; (3) removal from the face after turning up the soft parts and enlarging the anterior nares by temporary displacement of the maxillæ.—(Groves' *Synopsis of Surgery.*)

8. Medical jurisprudence is the application of the know-

ledge of any of the branches of medicine to the problem and requirements of the law.

9. Any statement made by a dying person who believes that he cannot recover and that he is, at that very time, in actual danger of death. The statement need not be sworn to; it should be voluntary and sincere; and it is admissible as evidence in a court if the individual dies.

10. In *diphtheria* the onset is more gradual; the temperature rises to about 101° to 103° F.; the tonsils are not much enlarged; there is an exudate of a thick grayish membrane which is very adherent, is removed only with difficulty, and leaves a bleeding surface; this membrane soon re-forms and may be found on the fauces and pharynx as well as on the tonsils; in the exudate the Klebs-Löffler bacilli may be found.

In *follicular tonsillitis* the onset is more sudden; the temperature may be a little higher than that of diphtheria; there is no membrane, but the tonsils are red and swollen, and in the crypts are seen white cheesy spots or plugs, which consist of broken-down epithelium, and are easily brushed away; Klebs-Löffler bacilli are not found.

THEORY AND PRACTICE.

1. Epidemic diseases are such as attack, either simultaneously or in rapid succession, a large number of persons in the same locality, or spread rapidly over a large territory. The causes of these epidemic outbursts are not known. "They have been attributed to climatic and meteorological conditions, accumulation of susceptible persons, facilities for convection or transmission, and (as regards cholera and other 'filth-diseases') imperfect sanitation. Scarlet fever, in temperate climates, where it has established itself permanently, tends to become epidemic at intervals of about five years; measles at intervals of about two years. Whooping cough is more irregular than either, but on an average becomes prevalent every second year. Diphtheria shows no very marked periodicity, apart from its dependence upon season, and enteric fever none. The liability to each kind of infection varies in man according to age and sex, as well as locality, climate, season, and surroundings. Similar variation occurs among the different races of men, and still more conspicuously among the different genera and species constituting the animal kingdom."

2. The *treatment of typhoid* "is largely supportive and prophylactic. On account of the wide distribution of the bacilli in the secretions, it is highly important that the excreta and all substances which come in contact with the patient should be thoroughly disinfected to prevent dissemination of the disease. Corrosive sublimate (1 :500), carbolic acid (1 :10), and chlorinated lime are used to disin-

fect the stools. Weaker solutions may be employed for sponging the perineum and anal region of the patient and for washing the hands of the attendants. The general treatment consists in absolute rest in bed with the enforced use of the bed-pan. The diet should be liquid, largely milk, and should be administered every 3 hours. Fever should be controlled by sponging, by the wet pack, and by the full bath. The Brand method consists in immersion of the body in a tub of water (70° F.) for 15 or 20 minutes every third hour when the temperature rises above 102.5° F. The medicinal treatment includes the use of antipyretics, intestinal antiseptics, and antityphoid serum. Abdominal pain, tympanites, and tenderness are best treated with fomentations and turpentine stupes, while meteorism may be relieved by the internal administration of turpentine and by the use of the rectal tube. Diarrhea, when it exceeds 4 or 5 stools daily, will require the withholding of all food except milk and the administration of opium, bismuth, codein, naphthalin, etc. Constipation should be relieved every two days by enemas containing soapsuds. When hemorrhage occurs, the foot of the bed should be elevated, an ice-bag or iced cloth should be applied to the abdomen, morphin should be given hypodermically, and opium (gr. 1) should be administered by the mouth every three hours. Peritonitis usually terminates fatally, and requires the same treatment as hemorrhage. Abdominal section should be performed as soon as the diagnosis is positive. Alcohol, ammonia, strychnin, digitalis, etc., should be used if heart failure supervenes. Nervous symptoms are greatly lessened by hydrotherapy, but nerve-sedatives may be necessary. Sore mouth may be prevented by cleanliness and the use of carbolized glycerin solution (0.5 per cent.) upon the gums and teeth."—(*Pocket Cyclopedia.*)

3. *Scarlet fever:* Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours. Character of eruption, a scarlet punctate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is bright, is on a red background, punctiform, and is uniform; the temperature is high, the pulse quick; the tongue is of the "strawberry" type, the lymphatics in the neck may be swollen, and there is sore throat.

Treatment: Isolation, rest in bed, liquid diet, ventilation, and antiseptic precautions, throat and nose should be cleansed with Dobell's solution. Daily sponging, acetanilid, strychnine are indicated. Inunctions with vaseline or cacao-butter during desquamation.

4. *Treatment of erysipelas.* The internal treatment consists in the administration of the tincture of the chlorid of iron, ♏10 every 2 hours, quinin, gr. 2 every 3 hours.

and other stimulants. The patient should be isolated, and warm fomentations applied. Carbolized petrolatum, ichthyol ointment (25 per cent.), hyposulphite of soda solution (12½ per cent.), nitrate of silver, carbolic acid, and tincture of iodine have been recommended in the local treatment. When due to infection from the nose, that organ should receive attention. In the cellulocutaneous forms surgical treatment will be necessary.—(*Pocket Cyclopedia.*)

5. *Rickets.* In addition to square box-shaped head, beaded prominences at junction of ribs with cartilages, pigeon breast, enlarged epiphyses, curved tibiæ, and prominent abdomen, there may also be present restlessness and feverishness at night, with profuse perspiration about the head, diffuse tenderness, nausea, vomiting, abdominal distention, slight diarrhea, nervousness, convulsions, etc. Dentition is delayed and when the teeth do appear they are badly formed. Muscular weakness is marked and prevents the child from walking or even sitting up (pseudo-paralysis).

Treatment: The first indications are to place the child in hygienic surroundings and to provide proper food. If the child is nursing and the mother's milk is poor, cow's milk should be substituted and properly modified to suit the individual requirements. Older children should be given beef-juice, eggs, and beef peptonoids, in addition to milk. Starches and sugars should be avoided. Orange and lemon juice are beneficial in many cases. Thin gruels may be used. Cod-liver oil, syrup of iodide of iron, hypophosphite of calcium, lactophosphate of calcium, lime-water, and phosphorous, are the drugs usually employed in this condition.—(Hughes' *Practice.*)

6. Acute Laryngitis. *The symptoms* are hoarseness, cough, expectoration of a viscid secretion, dryness of the throat, and pain on deglutition. In children the respiration may be embarrassed and paroxysms of croup may occur.

The treatment consists in the administration of fractional doses of calomel (gr. ¼) followed by a saline purge. Hot foot-baths and free diaphoresis by hot drinks with quinine (gr. 5) and Dover's powder are beneficial. The diet should be light. Potassium citrate solution with 1-drop or 2-drop doses of tincture of aconite is serviceable. Cold may be applied locally, and inhalations containing menthol, chloroform, and compound tincture of benzoin are valuable. Boroglycerid may be used locally. In children syrup of ipecac (3½) may be administered every 15 minutes until vomiting occurs.

7. "*Pneumonia* is an acute specific disease, due to infection with the diplococcus pneumoniæ (pneumococcus of Fraenkel) and, less frequently, with other microorganisms,

characterized by a fibrinous exudation into the pulmonary air-cells and bronchioles, and following a course that is more or less typical, the chief symptoms being those of toxemia and of interference with the respiratory and circulatory functions. It usually occurs in early adult life during the winter months, and affects women most often. It may result from surgical operations, ether narcosis, previous attacks, infectious fevers, nephritis, alcoholism, heart-disease, etc.

The affection is divided into 3 stages: Congestion, consolidation, and resolution.

The first stage is characterized by sudden onset with chill, a sharp pain in the side, rise of temperature, a short and sharp cough, rusty-colored, viscid sputum, and dyspnea. There may be headache, insomnia, scanty urine with diminution of urea, chlorids, phosphates, and sulphates, insomnia, and herpetic vesicles on the face, and there is always an increase in the number of leukocytes in the blood. Physical examination will reveal diminished expansion, impairment of the normal percussion note, feeble or suppressed respiratory murmur, moist or dry râles, crepitation, and sometimes a pleural friction sound.

In the second stage the dyspnea is more marked; the face is more or less livid in color; the temperature is high (104°-105° F.); and the pulse increases in rate (110-120), its tension and fullness lessening with the progress of the disease, and growing feeble and intermittent. Headache, delirium, and various other nervous symptoms may be present. Expansion is diminished and vocal fremitus is exaggerated upon the effected side. There is dullness with increased resistance over the consolidated lung, and auscultation detects bronchophony or bronchial breathing over this same area.

The third stage is ushered in by a sudden drop of temperature on about the fifth or ninth day, followed by a natural sleep, free sweating, and relief from suffering. In this stage the crepitant râle (râle redux) is heard in the midst of the bronchial breathing, together with numerous moist râles. Dullness may persist for some time, but usually by the twelfth or fourteenth day the lung has returned to its normal state."—Gould's and Pyle's *Pocket Cyclopedia.*)

8. (1) A systolic murmur, soft and blowing, heard best at the apex, and transmitted to the left axilla and toward the angle of the left scapula, indicates mitral regurgitation. (2) A presystolic murmur, harsh and rough, heard best very near the apex, and not transmitted, denotes mitral stenosis. (3) A diastolic murmur, soft, heard best in the second right intercostal space, and transmitted down the sternum or toward the apex, denotes aortic regurgitation.

(4) A systolic murmur, harsh, heard best in the second right intercostal space, and transmitted into the carotids, denotes aortic stenosis. (5) A systolic murmur, heard best over the lower end of the sternum, denotes tricuspid regurgitation. (6) A presystolic murmur, heard best over the ensiform cartilage, and not transmitted, denotes tricuspid stenosis. (7) A diastolic murmur, heard best in the second left intercostal space, denotes pulmonary regurgitation. (8) A systolic murmur, heard best in the second left intercostal space, and not transmitted to the large vessels of the neck, denotes pulmonary stenosis. (9) A murmur, usually systolic, soft, and blowing, heard best over the pulmonic area, associated with evidences of chlorosis or anemia, and affected by the position of the patient, is a hemic or functional murmur, and denotes as a rule an impoverished condition of the blood.

9. *Treatment of acute peritonitis* consists in rest in bed, the administration of opium or one of its alkaloids, and the application of hot or cold fomentations or turpentine stupes to the abdomen. If the affection is due to septic infection a saturated solution of magnesium sulphate should be given. If suppuration has occurred abdominal section should be performed with irrigation of the peritoneal cavity with normal salt solution (temperature 105°-110° F.) and the introduction of drainage.

10. *Bright's disease* is an inflammation of the kidneys without suppuration. There are three varieties; the differences are shown in the following table (from Gould and Pyle's *Cyclopedia*):

ACUTE PARENCHYMATOUS NEPHRITIS	CHRONIC PARENCHYMATOUS NEPHRITIS.	CHRONIC INTERSTITIAL NEPHRITIS.
1. Most common in children, from exposure or infectious fevers.	1. Later life; often the consequence of acute attack.	1. Late life; often results from alcoholism, gout, lead-poisoning.
2. Edema of lower eyelids; then of upper extremities, trunk, and, lastly, lower extremities.	2. In early stage same as acute form; later, dropsy may diminish.	2. Dropsy slight or entirely absent.
3. Urine scanty, dark or smoky color, high specific gravity. 1025 or over.	3. Urine normal or increased amount; specific gravity may fall to 1010; urine pale.	3. Urine greatly increased; specific gravity low, 1005; urine pale in color.

ACUTE PARENCHYMATOUS NEPHRITIS	CHRONIC PARENCHYMATOUS NEPHRITIS.	CHRONIC INTERSTITIAL NEPHRITIS.
4. Large amount of albumin.	4. Late in attack, greatly diminished; occasionally absent.	4. Albumin greatly diminished, often absent.
5. Variety of casts, such as hyaline, blood, epithelial, and waxy casts. also free red blood globules, and epithelial cells.	5. Large and small granular casts; compound granule cells, and fatty epithelium.	5. Hyaline or finely granular casts, occasionally dark in color; infrequently blood casts and oil droplets.
6. Urea diminished.	6. Urea diminished.	6. Urea diminished.
7. Recoveries frequent.	7. Recoveries rare.	7. Indefinite duration, but never cured.

MATERIA MEDICA.

1. In diabetes; particularly diabetes mellitus.
2. Nux vomica and ignatia (and their alkaloids strychnine and brucine), thebaine, ammonia, ether, chloroform, opium, ergot, alcohol in small doses.
3. Conium, three grains; fluid extract of conium, three minims.
4. Yes; on account of the rapidity of its action, ether is a very valuable cardiac stimulant.
5. The patient must be kept in the recumbent position; the stomach should be washed out with infusion of tea; give stimulants and keep the patient warm; tannic acid may be given, as the chemical antidote; and tincture of aconite, as the physiological antidote.
6. Ipecac is used externally as an antiseptic, in cases of anthrax. Internally as a stomachic, an expectorant, an emetic, a diaphoretic, and a cholagogue. It is given in cases of dyspepsia, dysentery, bronchitis, asthma, croup, and in the vomiting of pregnancy.
7. The caustic alkalies are incompatible with belladonna.
8. It is an irritant; applied externally it hastens the coagulation of the blood and makes a firmer clot. It is used in cases of gastric catarrh and fermentative dyspepsia, in hematemesis and hemoptysis, in glandular swellings of tuberculous patients. It has also been employed in the treatment of pneumonia and phthisis. The dose is seven and a half grains.
9. Auri et sodii chloridum is the only official gold salt; dose, one-tenth of a grain.
10. Iron, manganese, arsenic, bismuth, and phosphorus.

KENTUCKY.

STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF HEALTH OF KENTUCKY.

ANATOMY.

1. Describe (*a*) the gracilis, (*b*) gastrocnemius, (*c*) rectus femoris, giving origin and insertion of each.
2. Describe the pancreas.
3. Name the structures to be divided in operating for strangulation of an oblique inguinal hernia.
4. Describe the fourth cervical vertebra and distinguish it from the fourth dorsal vertebra.
5. Bound the axilla and name and give relations of structures in axillary space.
6. Name the muscles, nerves, and arteries severed by a cross section of the thigh at the junction of the middle and lower thirds.
7. Describe (*a*) the superficial and deep palmar arches, (*b*) the brachial artery, branches and relationship.
8. Describe and give contents and relations of parts in Scarpa's triangle.
9. Describe (*a*) the superior longitudinal sinus, (*b*) the lateral sinus, (*c*) torcular Herophili.
10. Give the anatomy of the liver.

SURGERY.

1. Give varieties of hernia; describe one operation for inguinal hernia.
2. (*a*) Name different kind of fractures and give differential diagnosis between fracture of the neck of the femur and dislocation of hip. (*b*) Give treatment of the latter.
3. How would you make a diagnosis of gonorrhea? Give a bacteriological examination.
4. What is empyema? Give diagnosis, prognosis, and treatment.
5. Give symptoms, diagnosis, and treatment of intestinal obstruction.
6. How would you diagnose retention of urine? What would you do for it?
7. How would you determine that a limb is injured beyond hope in a crushing accident?
8. What are the indications for appendectomy?
9. Give the treatment of shock resulting from hemorrhage.
10. Give contraindications to the employment of ether and chloroform.

MEDICAL JURISPRUDENCE.

1. What constitutes expert testimony?

2. How would you determine that a full term dead baby was born alive?
3. How would you determine (*a*) that a wound was inflicted by a blunt instrument? (*b*) or that it was done before or after death?
4. Differentiate between idiocy and lunacy.
5. What is paresis? Give symptoms, prognosis, and treatment.

OPHTHALMOLOGY.

1. Differentiate iritis and glaucoma, giving symptoms of each.
2. Describe and give etiology of (*a*) phlyctenular keratitis, and (*b*) interstitial keratitis.
3. What is ophthalmia neonatorum? Give etiology and the probable results of a badly managed case.
4. Give symptoms and etiology of ciliary blepharitis.
5. Differentiate myopia and hyperopia and hypermetropia; give the anatomical reasons for their existence, and tell what you would recommend for the relief of each.

PHYSIOLOGY.

1. (*a*) Give several varieties of food. (*b*) Which enzymes act on each variety?
2. (*a*) Describe absorption, and give the function of the lymphatics. (*b*) Describe the thoracic duct.
3. Give chemistry and uses of bile.
4. Describe the circulation of the blood. What forces govern it?
5. Give histology of the kidney and function of the various structures.
6. Name and give the function of each of the cranial nerves.
7. Describe and give functions of sympathetic nervous system.
8. What are the functions of the skin?
9. Describe the blood.
10. Describe the cardiac cycle.

OBSTETRICS AND GYNECOLOGY.

1. Define presentation and position.
2. Tell exactly how you would manage a shoulder presentation.
3. (*a*) What is mensuration? (*b*) How is it conducted in obstetrical cases? (*c*) How is it of value?
4. How would you diagnose and conduct the delivery of a hydrocephalic fetus?
5. (*a*) What would you suspect in antepartum hemorrhage? (*b*) How confirm your diagnosis? (*c*) How manage the case?

6. (*a*) When is ventrofixation indicated? (*b*) What is ballottement, (*c*) when is it valuable and how is it performed?

7. Give diagnosis of extrauterine gestation.

8. Give symptoms and pathology of carcinoma uteri.

9. Describe ovary and uterus during stages of menstruation.

10. (*a*) Give two indications for hysterectomy. (*b*) Reasons for preferring abdominal or vaginal method.

CHEMISTRY.

1. What is (*a*) an atom? (*b*) a molecule? (*c*) What are isomeric compounds?

2. (*a*) What are the symptoms of acute arsenic poisoning? (*b*) What is the chemical combination of its antidote and how does it act? (*c*) Tell in detail how to detect arsenic in the stomach of a case of suspected poisoning.

3. Describe in detail a method for the quantitative estimation of sugar in the urine.

4. Tell in detail how to detect bile in the urine.

5. (*a*) Contrast dairy milk with human milk, and (*b*) give a brief description of the essentials for the production of pure dairy milk.

6. What is (*a*) H_2SO_4, (*b*) BaO_2, (*c*) HCl, (*d*) HNO_3? (*e*) What is the formula for methyl alcohol?

7. (*a*) What is acetphenetidin? (*b*) hexamethylene-tetramine? (*c*) From what are they prepared?

8. (*a*) Describe oxygen. (*b*) Give its formula, (*c*) valency, (*d*) atomic weight. (*e*) Tell how to prepare it, and give formula of your method.

9. (*a*) What is specific gravity? (*b*) How obtained for solids, (*c*) liquids, (*d*) gases?

10. Describe the chemical changes in starch during digestion in detail, giving formulas.

NERVOUS DISEASES.

1. Give etiology of migraine.

2. Give etiology and symptoms of sciatica.

3. Describe (*a*) epilepsy, (*b*) catalepsy.

4. Describe a case of progressive bulbar paralysis.

5. Differentiate between (*a*) illusions, (*b*) delusions, (*c*) hallucinations.

PREVENTIVE MEDICINE.

1. How long after recovery would you keep in quarantine a case of (*a*) diphtheria, (*b*) scarlet fever, (*c*) smallpox?

2. Name the portals of entry of tubercular infection in the order of their importance.

3. Describe in detail just how you would manage cases of typhoid fever for the protection of the community.
4. How would you disinfect a room after a communicable disease?
5. What is the difference between contagion and infection?

PRACTICE.

1. Define constipation; give etiology, diagnosis, and prognosis.
2. Define vertigo; give varieties and diagnosis.
3. Define myxedema; give etiology, diagnosis, and prognosis.
4. Define hydrothorax; give etiology, diagnosis and prognosis.
5. Define angina pectoris; give etiology, diagnosis, and prognosis.
6. Define asthma; give etiology, diagnosis, and prognosis.
7. Define adenoids; give etiology, symptoms, and dangers.
8. Define enterocolitis in a child; give etiology, diagnosis, and prognosis.
9. Give essentials for the production and preservation of pure dairy milk.
10. Give etiology, diagnosis, and prognosis of meningitis in a child.

OTOLOGY.

1. What is Politzer's method of inflating the tympanum, and how is it accomplished?
2. Define tinnitus aurium, and give the cause of it.
3. Give etiology, symptoms, and diagnosis of acute otitis media.
4. What is the pyramid of light, and where would you expect to find it?
5. Give symptoms, etiology, and probable serious results of mastoiditis.

BACTERIOLOGY.

1. Tell in detail (*a*) how you would detect malarial organisms in blood, (*b*) how distinguish between the quartan and estivoautumnal parasite.
2. Describe (*a*) Widal's test for typhoid fever; (*b*) what is its diagnostic value?
3. Differentiate between the culture of *Bacillus typhosus* and that of the *Bacillus coli communis.*
4. How would you examine a suspected specimen of sputum for tubercle bacilli? Give details.
5. Define (*a*) toxins, (*b*) antitoxins, (*c*) amboceptors, (*d*) bacterioproteins, (*e*) lysins.

6. Give the morphology of the tetanus bacillus; what are its toxins?

7. Tell in detail how to examine a suspected urethral discharge for gonococci.

8. Discuss Ehrlich's side-chain theory of immunity.

9. Differentiate between the pneumococcus and Pfeiffer's bacillus of influenza.

10. What is phagocytosis? What is accomplished by it?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF HEALTH OF KENTUCKY.

ANATOMY.

1. The *gracilis* arises from the lower part of the symphysis pubis, and from the pubic arch, and is inserted into the upper and inner part of the shaft of the tibia, below the tuberosity. Its nerve supply is the obturator. It rotates the leg inwards, and flexes it; it is also an adductor of the thigh.

GASTROCNEMIUS: The inner head arises from a depression on the upper and back part of the inner condyle of the femur and the adjacent part of the femur; the outer head from an impression on the external surface of the outer condyle, and from the posterior surface of the femur immediately above the condyle. It unites with the tendon of the soleus to form the tendo Achillis, which is inserted into the lower part of the posterior surface of the os calcis. *Nerve supply:* Internal popliteal. *Action:* It extends the foot, helps to flex the femur on the tibia (when acting from below); and aids in walking, standing, dancing, running, etc.

RECTUS FEMORIS. *Origin:* Two heads, one from the anterior inferior spine of the ilium; the other from groove above the brim of the acetabulum. *Insertion:* Into the patella, in common with the Vasti and Crureus. *Action:* It flexes the hip and extends the knee.

2. *Pancreas: Length*, 6 to 8 inches. Consists of a body, enlarged to the right at its head, with which the body is connected by a narrow part or neck, and narrowed to the left, where it ends as the tail.

Position.—Placed in the epigastric and both hypochondriac regions, directed transversely across posterior wall of abdomen.

Relations of the body:—

In front. Stomach and small omentum.

Behind. Aorta, crura of diaphragm, splenic vein, left kidney, left supra-renal body and left renal vessels.

Upper border. From right to left; celiac axis, splenic artery.

Lower surface. From right to left; superior mesenteric vessels, inferior mesenteric vein, transverse colon.

Left end or tail. Touches lower part of anterior surface of spleen.

Right end or head. Embraced by three parts of duodenum, from which it is partly separated, behind by bile-duct, and in front by pancreatico-duodenal arteries. Is covered in front by the lesser sac of peritoneum.

Behind it lies on the 1st and 2nd lumbar vertebræ, from which it is separated by the crura of the diaphragm, inferior vena cava, superior mesenteric vessels, and portal vein. The superior mesenteric vessels overlap the left end of the head, lying in a groove on this surface.

Duct (canal of Wirsung): extends transversely from left to right, opens into 2nd part of the duodenum in common with the ductus communis choledochus.

Arteries: pancreatic of splenic, superior pancreatico-duodenal of hepatic, and inferior pancreatico-duodenal of superior mesenteric.

Veins: open into splenic and superior mesenteric.

Nerves: from the solar plexus.—(*Aids to Anatomy.*)

3. The structures to be divided in operating for strangulation of an oblique inguinal hernia are: Skin, superficial fascia, intercolumnar fascia, Cremaster muscle and fascia, infundibuliform fascia, subserous areolar tissue, and peritoneum.

4. Differences between the fourth cervical vertebra and the fourth dorsal vertebra: *The fourth cervical vertebra* has a small, transversely elongated body, with no facets for ribs; the laminæ are long and slender; the spinous process is short, nearly horizontal, and bifid; the transverse processes are short and contain a foramen for the vertebral artery; the superior articular process is directed upward and slightly backward; the inferior articular process is directed downward and slightly forward; the spinal foramen is large and triangular.

The fourth dorsal vertebra has a heart-shaped body with a facet on each side for articulation with a rib; the laminæ are broad and deep; the spinous process is long and points downward; the transverse processes are long, articulate with the tubercle of a rib, and do not contain a foramen; the superior articular process is directed backward and slightly outward; the inferior articular process is directed forward and slightly inward; the spinal foramen is smaller and circular.

5. The axilla is *bounded*: *Anteriorly,* by the clavicle, Subclavius, Pectoralis major, costocoracoid membrane, Pectoralis minor; *posteriorly,* by the Subscapularis, Teres

major, and Latissimus dorsi; *internally,* by the first four ribs, first three Intercostal muscles, Serratus magnus; *externally,* by the humerus, Coracobrachialis, and Biceps.

"*Contents*: The axillary vessels and brachial plexus of nerves, with their branches, some branches of the intercostal nerves, and a large number of lymphatic glands, all connected together by a quantity of fat and loose areolar tissue. *Their position*: The axillary artery and vein, with the brachial plexus of nerves, extend obliquely along the outer boundary of the axillary space, from its apex to its base, and are placed much nearer the anterior than the posterior wall, the vein lying to the inner or thoracic side of the artery and partially concealing it. At the fore part of the axillary space, in contact with the pectoral muscles, are the thoracic branches of the axillary artery, and along the anterior margin of the axilla the long thoracic artery extends to the side of the chest. At the back part, in contact with the lower margin of the subscapularis muscle, are the subscapular vessels and nerves; winding around the lower border of this muscle is the dorsalis scapulæ artery and veins; and toward the outer extremity of the muscle the posterior circumflex vessels and the circumflex nerve are seen curving backward to the shoulder.

"Along the inner or thoracic side . . . are some important nerves, viz., the posterior thoracic or external respiratory nerve, descending on the surface of the serratus magnus, to which it is distributed; and perforating the upper and anterior part of this wall, the intercostohumeral nerve or nerves, passing across the axilla to the inner side of the arm." (Gray's *Anatomy.*)

6. In a cross section of the thigh, at the junction of the middle and lower thirds there are severed: *Muscles,* Vastus internus, Rectus femoris, Crureus, Vastus externus, Biceps, Semitendinosus, Semimembranosus, Gracitis, Sartorius, Adductor magnus; *Nerves,* sciatic, long saphenous; *Arteries,* superficial femoral, anastomotic, deep femoral, perforating.

7. (*a*) The *superficial palmar arch* is formed by the ulnar artery, and is completed by the ulnar artery anastomosing with a branch of the radial (superficial volar or princeps pollicis). It gives off the four digital branches. The surface marking is a line drawn transversely across the palm from a point where the web of the thumb joins the palm. The *deep palmar arch* is formed by the radial artery, and is completed by the radial artery anastomosing with a deep branch of the ulnar. Its branches are the palmar interosseous, perforating, and palmar recurrent arteries. The surface making is a line dawn transversely across the palm, one-haif inch nearer the wrist than the superficial arch.

(*b*) *The brachial artery* is the continuation of the axillary, begins at the lower margin of the insertion of the Teres major, passes down the anterior aspect of the arm, and terminates about half an inch below the bend of the elbow, where it bifurcates into the radial and ulnar arteries. It passes along the inner borders of the Coracobrachialis and Biceps muscles, it is superficial throughout its course, is accompanied by venæ comites, and at about its center is crossed by the median nerve, which passes from the outer to the inner side of the artery.

Branches: Superior profunda, inferior profunda, nutrient, anastomotica magna, and muscular.

Relations: In front, the skin, fascia, bicipital fascia median basilic vein, median nerve, coraco-brachialis and biceps; *behind,* triceps, musculospiral nerve, superior profunda artery, coraco-brachialis, and brachialis anticus: *outer side,* median nerve (above), coraco-brachialis and biceps; *inner side,* basilic vein, internal cutaneous and ulnar nerves, and median nerve (below).

8. Scarpa's triangle is a triangular area or depression situated just below the fold of the groin. It is bounded *above* by Poupart's ligament, *externally* by the Sartorius, and *internally* by the inner margin of the Adductor longus; its *apex* is formed by the junction of the Adductor longus and Sartorius. The *floor* is formed, from without inward, by the Iliacus, Psoas, Pectineus, Adductor brevis, and Adductor longus. *Contents:* The femoral vessels pass from about the center of the base to the apex, the artery being on the outer side of the vein; the artery gives off the superficial and profunda branches, and the vein receives the deep femoral and internal saphenous; the anterior crural nerve lies to the outer side of the femoral artery; the external cutaneous nerve is still further external, lying in the outer corner of the space; just to the outer side of the femoral artery, and in the sheath with it, is the crural branch of the genitocrural nerve. At the apex, the vein (which at the base was internal to the artery) lies behind the artery. The triangle also contains fat and lymphatics.

9. *Superior longitudinal sinus* is situated in the attached margin of the falix cerebri. It begins at the foramen cæcum, and terminates in the torcular Herophili.

Lateral sinuses are situated (mostly) in the attached margin of the tentorium cerebelli; they begin at the internal occipital protuberance, and go to the jugular foramen, where they end in the internal jugular vein.

Torcular Herophili is the dilated extremity of the superior longitudinal sinus; it is lodged to the right side of the internal occipital protuberance; one lateral sinus is derived from it; it also receives blood from the occipital sinus.

10. "The *liver* is the largest gland in the body, measuring in its transverse diameter from ten to twelve inches, and its anteroposterior six to seven, and its thickest part about three inches, and weighing about from three to four pounds. It occupies the upper part of the abdominal cavity, and the right hypochondriac, epigastric, and a portion of the left hypochondriac regions. Its upper surface is convex and rests against the diaphragm and a small portion of the abdominal parietes in front. Its lower surface is in contact with the duodenum and stomach, the right kidney and suprarenal capsules, and the hepatic flexure of the colon. It is divided by the longitudinal fissure into the right and left lobes. The liver has five fissures, five lobes, five ligaments, five sets of vessels, and is inclosed in a fibrous coat, continuous at the tranverse fissure with the capsule of Glisson. It is also invested by the peritoneum, except at the attachment of the coronary ligament." (Young's *Anatomy*.)

The *fissures* are: umbilical, of ductus venosus, of gall bladder, transverse, and for inferior vena cava.

The *lobes* are: right, left, caudate, quadrate, and Spigelian.

The *ligaments* are: falciform, 2 lateral, coronary, round and of ductus venosus.

The *vessels* are: Hepatic artery and veins, portal vein, and hepatic duct.

SURGERY.

1. VARIETIES OF HERNIA: Hernia may be classified: I. *Anatomically*:

1. Inguinal
   - Oblique
     - Acquired
     - Congenital
     - Infantile or encysted
   - Direct
     - External
     - Internal
   - Interstitial
     - Intraparietal
     - Interparietal
     - Extraparietal

   [Incomplete, or Bubonocele.]
2. Femoral
3. Umbilical
   - Congenital
   - Of infants
   - Of adults

4. Ventral. 5. Lumbar. 6. Obturator. 7. Diaphragmatic. 8. Pudendal, etc.

II. *Clinically*: Reducible irreducible, obstructed or incarcerated, inflamed, and strangulated.

2. (a) Fractures are variously classified:

I. Simple, compound, and complicated.

II. Complete (transverse, oblique, spiral, longitudinal) and incomplete (fissured, greenstick).
III. Single, and multiple.
IV. Comminuted, impacted, etc.
V. Intra- and extra-articular; intra- and extracapsular.

In fracture of the neck of the femur, the head of the femur will be found in the acetabulum; in dislocation, the acetabulum will be empty, and the head of the femur will be found elsewhere, *e.g.* on the dorsum of the ilium. In the fracture, crepitus *may* be elicited; in the dislocation, never. In the dislocation, there is inversion and a fixed position of the limb, both of which are absent in fracture.

3. The diagnosis of gonorrhea is made by finding gonococci within the leucocytes in a urethral discharge. For details, see below—BACTERIOLOGY, Number 7.

4. EMPYEMA. *Etiology:* Wounds, injuries, pleuropneumonia, direct extension of a suppurative process in the lung, abdomen, or neck. The bacteria will vary with the cause; *Diplococcus pneumoniæ* is the commonest; tubercle bacillus, staphylococcus, streptococcus, *Colon bacillus* may also be present.

Pathology: The organisms causing it are pneumococci, streptococci, staphylococci, tubercle bacilli, *Bacillus coli*, and actinomycosis.

The physical signs are those of fluid in the pleural cavity; that side does not move well, the percussion note is dull, there is absence of breath sounds, vocal fremitus and resonance are diminished. Left alone, an empyema may burst through an intercostal space, usually the fifth. The lung is collapsed in extent according to the amount of pus. The pleura, at first covered with lymph, soon becomes covered with layers of granulation tissue, the deeper part of which is converted into fibrocicatricial tissue, and the lung itself also undergoes some fibroid change. If the pus is let out early the lung and pleura soon expand, but if allowed to go on the infiltration of the lung and the density of the scar tissue covering it hinder expansion. Nature attempts to remedy this in various ways. (1) The other lung expands and pushes the heart over to the opposite side; (2) the chest wall falls in, the intercostal spaces are obliterated, and the spine is curved, with its concavity toward that side; (3) the abdominal viscera are pushed up; and (4) exuberant granulations form on the pleura. If a cavity still remains an operation is necessary.

Symptoms: Fever, sweats, chill, diminished breath sounds and vocal fermitus, impaired mobility of chest, dullness on affected side, heart displaced to opposite side, leucocytosis.

Treatment: Aspiration, drainage, irrigation, resection of

ribs (Estlander's operation), or resection of chest wall (Schede's operation).

5.

Strangulation.	Intussusception.	Twists (Volvulus)
Subjective Symptoms	*Subjective Symptoms*	*Subjective Symptoms*
1. Generally occurs after age of 20.	1. Most frequent in childhood.	1. Most frequent after age of 30.
2. Pain localized, rapid collapse.	2. Constant tenesmus.	2. Pain diffuse.
3. Pain intense, paroxysmal in character.	3. Pain develops suddenly and is continuous.	3. Pain paroxysmal; recurs less often than in strangulation.
4. Constipation complete.	4. Frequent diarrhea, passage of bloody mucus.	4. Constipation complete.
Objective Symptoms	*Objective Symptoms*	*Objective Symptoms*
1. Temperature often subnormal.	1. Temperature normal or subnormal.	1. Temperature slightly elevated.
2. Pulse very weak.	2. Same as in strangulation.	2. Same as in strangulation.
3. Stercoraceous vomiting comes on early	3. Same as in strangulation.	3. Same as in strangulation.
4. Location in small intestine.	4. Localization in small intestine; bowel frequently protrudes at rectum.	4. Location, small intestine; abdomen often protrudes, in certain areas, giving dullness on percussion.

The treatment in acute cases consists in the withholding of food by the mouth, irrigation of the stomach and colon, and the administration of cracked ice by the mouth and opium hypodermically. Exploratory incision may be performed. In chronic obstruction the diet should be restricted and measures should be taken to remove the obstruction. Impacted feces may require the use of the scoop or similar instrument. Impacted gall-stones may require cholecystotomy. Internal strangulation should be relieved by early operation. In volvulus occasionally the intestine may be untwisted by insufflations of air or hydrogen or a large enema. Intussusception is treated similarly. but operation may be required in both conditions. Colotomy or enterotomy will be necessary if there are strictures or marked contractions.

6. Retention of Urine. Intense pain, desire to urinate but not ability; the pain is in penis, thighs, and perineum; typhoid state may supervene. It is to be diagnosed from

(1) *Suppresion of Urine.*—In this: The bladder is empty and contracted. Follows some severe shock, or operation, or nephritis. Scanty urine is of high specific gravity and albuminous.

(2) *Calculous Anuria.*—History of lumbar pain and colic. Bladder is empty. Pain is absent or exists only in the loins.

(3) *Ruptured Bladder.*—Follows an injury. Bladder is empty or contains bloody urine. More lotion can be put in than got out of the bladder.

Treatment: (1) WHEN CONGESTIVE SPASM IS THE CAUSE: First try hot baths, with morphine and belladonna suppositories. Then pass a soft catheter.

(2) WHEN DEFINITE OBSTRUCTION EXISTS: Pass large soft catheter first; if this fails, then small or filiform catheters.

(3) WHEN THE PROSTATE IS ENLARGED: First try large soft catheter, then catheter coudé, then metal prostatic catheter.

(4) WHEN NO KIND OF CATHETER CAN BE PASSED:—

Suprapubic Aspiration.—Pass a soft catheter through the cannula and leave it.

Suprapubic Cystotomy.—When a large prostate or vesical growth can be dealt with later, or calculus at the same time.

PERINEAL CYSTOTOMY.—When a urethral stricture exists which can be treated at the same time.

In Acute Retention of Many Hours Standing, and

In Chronic Retention with Cystitis, it is better to relieve the retention first by a catheter or aspiration, and do a radical operation later when the patient and the bladder are in better condition. (Grove's *Synopsis.*)

7. A limb may be said to be injured beyond hope in a crushing accident: (1) When it is pulpefied; (2) when the main artery or vein or both are severed and the collateral circulation is also interfered with; (3) when very extensive cellulitis or gangrene appears within a short time of the accident; (4) when there is extensive laceration of tissues and extensive comminution of the bone.

8. *The indications for appendectomy* vary according to the views of the surgeon. Some maintain that every case of appendicitis should be operated on as soon as the diagnosis is made. Others would operate only in case of rupture, or when suppuration occurs, or in cases which do not improve in a week or so, or in cases which are steadily getting worse. Probably all would agree in taking out every appendix that has undergone more than one mild attack.

9. Put the patient recumbent, raise the feet, lower the head, apply warmth, give intravenous infusion, or hypodermoclysis. This last is given as follows; Insert an aspirator tube into the loose cellular tissue under the breast or in the loin, cleansing the part first. The tube is attached to a fountain syringe, which is filled with normal salt solution, and hung up two or three feet above the bed.

10. The following contraindications for ether and chloroform are from Hare's *Practical Therapeutics: "Ether* should not be used by inhalation in bronchitis or acute

nephritis, because of its irritant properties; in peritonitis or gastritis, because it is apt to induce vomiting; in aneurysm or in the presence of marked vascular atheroma, because it may rupture a blood-vessel by raising arterial pressure; nor in diabetes, lest it produce diabetic coma; and if anemia is present and an examination of the blood shows that the hemoglobin is below 50 per cent., the use of the drug should be avoided if possible.

"*Chloroform* is not to be used in cases of fatty heart or dilatation of the heart, in those with a known idiosyncrasy, nor in the so-called lymphatic persons with overgrowth of lymphoid tissues, as, for example, adenoids. In the latter case it is particularly apt to cause sudden death. In valvular disease of the heart chloroform may be used with caution, although ether is preferable. Given a case of valvular disease that must be subjected to operation, the chances are bettered with an anesthetic than without it, as the pain and mental shock are worse for the heart than is the anesthetic."

MEDICAL JURISPRUDENCE.

1. In expert testimony the witness may give his *opinion* on facts or supposed facts as noted by himself or asserted by others. *Theoretically,* this can only be done by those perfectly familiar with the subject in question; but *practically* any (or almost any) physician with a license to practise is accepted as an expert witness.

2. If respiration has taken place, its lungs will float on being put into water; if respiration has not taken place, the lungs will sink. Further, the lungs before respiration are situated at the back of the thorax and do not fill the cavity; whereas, after respiration, they fill the whole cavity.

3. (a) A wound inflicted by a blunt instrument will have somewhat of the appearance of a contused wound; the edges will not be so clean cut, and the surrounding tissues will be more or less bruised.

(b) A wound inflicted during life is generally characterized by hemorrhage, coagulation of the blood, eversion of the edges, and retraction of its sides. It may also be inferred that the wound was inflicted during life if any of the following are noticed: The presence of inflammation, swelling, pus or gangrene on the edges of the wound, or if there is any sign of beginning cicatrization.

4. "Idiocy differs from other states of insanity in the fact that it is marked by a congenital deficiency of the mental faculties. There is not here a perversion or a loss of what has once been acquired, but a state in which, from defective structure of the brain, the individual has never been able to acquire any degree of intellectual power to fit him for his social position. It commences with life and

continues through it." (Taylor's *Medical Jurisprudence.*)

5. *Paresis* is an organic disease of the brain, characterized by progressive loss of power and by a deterioration of the mental faculties, ending eventually in dementia and death. It occurs most frequently in males between the ages of 30 and 60, and may result from overwork, mental and physical strain, intemperance, spyhilis, and lead-poisoning. It is manifested by change of disposition, loss of memory, mental exaltation, delusions of grandeur, loss of facial expression, tremors, difficulty of speech, and later mental and physical deterioration. The average duration of the affection is 2 to 3 years. It is practically incurable when the characteristic symptoms have developed. The treatment is conducted upon general lines, best in a sanitarium, but it is unsatisfactory. (*Pocket Cyclopedie.*)

I.— OPHTHALMOLOGY.

	GLAUCOMA.	IRITIS.
Age	Over forty.	Any.
Tension	Plus.	Normal.
Secretion	None, or watery.	None, or watery.
Congestion	General, especially scleral.	General, especially circumcorneal.
Cornea	Cloudy and steamy surface.	Cloudy.
Anterior chamber	Shallow.	Unchanged.
Iris	Discolored.	Discolored.
Pupil	Dilated, oval.	Contracted, synechiæ.
Pain	Severe, continuous.	Especially at night.
Vision	Much reduced.	Somewhat reduced.
Treatment	Eserine, pilocarpine, iridectomy.	Atropine.

(From Alling and Griffin's *Diseases of the Eye and Ear.*)

2. (*a*) *Phlyctenular keratitis* "is usually associated with phlyctenular conjunctivitis in children of scrofulous diathesis, but may occur in others. It is characterized by one or more small cysts found on the limbus of the conjunctiva and extending upon the cornea. The symptoms are acute pain, photophobia, lacrimation, and the characteristic bundle of vessels, with a yellow crescent at the apex, its concavity toward the apex. Blepharospasm is present and may be severe."

(*b*) *Interstitial keratitis.*—"Deep inflammation of the cornea. The whole cornea becomes more or less opaque and has a ground-glass appearance. Pericorneal injection is present. Inflammations of the iris, ciliary body, and cho-

roid occur as complications. The affection is due to some constitutional disease, usually hereditary syphilis, but sometimes tuberculosis. The condition is of long duration and results in reduction of visual acuity. Pain, lacrymation, and photophobia appear as subjective symptoms."—(Gould and Pyle's *Pocket Cyclopedia.*)

3. Ophthalmia neonatorum is an infectious, purulent inflammation of the conjunctiva in the newborn, due to the gonococcus or other pyogenic germ; produced by contact of the eye with the vaginal secretion of the mother during labor, or infected fingers, or instruments, etc. The probable results of a badly managed case are: Ulceration and sloughing of the cornea, perforation of the anterior chamber, and blindness.

4. CILIARY BLEPHARITIS. *Symptoms:* "In the superficial or non-ulcerative form the margins of the lids are swollen and reddened, and present numerous whitish scales at the bases of the lashes. The latter fall out readily, but are replaced, since there is no destruction of the hair follicles In the deep or ulcerative form the edges of the lids are reddened and swollen, and present yellowish crusts which glue the lashes together. On removing these crusts small ulcers are seen about the attachments of the lashes; these ulcers bleed readily. The lashes become distorted, fall out, and grow scarce, since they are not replaced on account of destruction of the hair follicles. In both forms there will be itching, soreness, epiphora, and sensitiveness to light."

Etiology: "Poor hygienic surroundings; debilitated conditions of the system; following the exanthemata, especially measles; exposure to irritating atmosphere—smoke, wind, dust; late hours; insufficient sleep; uncorrected errors of refraction, especially hyperopia and astigmatism; chronic conjunctivitis; lachrymal disorders; lack of cleanliness. The disease occurs at all ages, but is very common in children."—(May's *Diseases of the Eye.*)

5. *Myopia* is a condition in which the eye is practically too long, and therefore parallel rays are brought to a focus in front of the retina. *Treatment:* Concave lenses.

Hypermetropia or Hyperopia is a condition in which the eye is practically too short, and therefore parallel rays are brought to a focus behind the retina. *Treatment:* Convex lenses.

PHYSIOLOGY.

1. (a) Foods are classified as follows:

I. Inorganic { Water. Salts.

II. Organic { Non-nitrogenous { Carbohydrates. Fats. Nitrogenous—Proteids.

(b) Carbohydrates are acted on by ptyalin and amylopsin, fats by steapsin, and proteids by pepsin and trypsin.

2. Absorption is the process by which the products of digestion are taken into the blood current. The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unite to form the portal vein, and (2) by the lymph vessels of the small intestine, which converge to empty into the thoracic duct. The water, inorganic salts, proteids, and sugar go by way of the portal vein to the ascending vena cava; the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

The *function of the lymphatic system* is to provide the tissues with material necessary to their functional activity, growth, and repair; to receive from the tissues their waste products; and to convey the products of digestion and absorption to the blood current.

The *thoracic duct* extends from the second lumbar vertebra, where it commences by a dilatation, the *receptaculum chyli,* to junction of left internal jugular with left subclavian vein. The abdominal part is placed on the front of the body of the second lumbar vertebra, behind and to the right side of the aorta and on the inner side of the right crus; it then enters the thorax through aortic opening, on the right side of aorta, lying between it and the vena azygos major, and passes upward to right of aorta on right intercostal vessels. Opposite the fourth dorsal vertebra it passes to the left behind arch, and runs along the left side of the esophagus, behind the left common carotid artery. At the level of the seventh cervical vertebra it turns outward, and, passing behind left internal jugular and crossing first part of left subclavian artery, arches over the apex of the left pleura to open at the angle of union of the left internal jugular and left subclavian veins. (From *Aids to Anatomy.*) The *portions of the body drained by it* are: Both lower limbs; abdomen, except upper surface of the liver; left half of thorax; left side of head and neck, and left upper extremity.

3. The constituents of the bile may be shown in the following table, which presents the averages of three analyses given by Hammarsten; the results are given in parts per thousand:

Water	971.380
Solids	28.620
Mucin and pigments	4.910
Bile salts	12.197
Taurocholate	2.431
Glycocholate	9.766

Fatty acids from soaps	1.200
Cholesterin	1.243
Lecithin and fats	0.970
Soluble salts	7.360
Insoluble salts	0.317

The functions of the bile are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis; and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach, and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action.

4. The circulation of the blood is regulated in (a) *the arteries* by: (1) The elasticity and tone of the arteries, (2) the force and frequency of the cardiac contractions, (3) the resistance in the capillaries; (b) in the *capillaries* it is regulated by (1) the action of the heart, (2) the action of the arteries; (c) in the *veins* it is regulated by (1) the action of the heart, (2) aspiration of the thorax, (3) the contraction of the muscles, and (4) slightly by the valves in the veins.

5. "The kidney is a compound, tubular gland composed of microscopic tubules whose function it is to secrete from the blood those waste products which collectively constitute the urine. If the apex of each pyramid be examined with a lens, it will present a number of small orifices, which are the beginning of the uriniferous tubules. From this point the tubules pass outward in a straight but somewhat divergent manner toward the cortex, giving off at acute angles a number of branches. From the apex to the base of the pyramids they are known as the tubules of Bellini. In the cortical portion of the kidney each tubule becomes enlarged and twisted, and after pursuing an extremely convoluted course, turns backward into the medullary portion for some distance, forming the descending limb of Henle's loop: it then turns upon itself, forming the ascending limb of the loop, reënters the cortex, again expands, and finally terminates in a spheric enlargement known as *Müller's* or *Bowman's capsule*. Within this capsule is contained a small tuft of blood-vessels, constituting the *glomerulus*, or *Malpighian corpuscle*. Each tubule consists of a basement membrane lined by epithelium cells throughout its entire extent. The tubule and its contained epithelium vary in shape and size in different parts of its course. The termination of the convoluted tube consists of a little sac or capsule, which

is ovoid in shape and measures about 1/200 of an inch. This capsule is lined by a layer of flattened epithelial cells, which is also reflected over the surface of the glomerulus. During the periods of secretory activity the blood-vessels of the glomerulus become filled with blood, so that the cavity of the sac is almost obliterated; after secretory activity the blood-vessels contract and the sac-cavity becomes enlarged. In that portion of the tubule lying between the capsule and Henle's loop the epithelial cells are cuboid in shape; in Henle's loop they are flattened, while in the remainder of the tubule they are cuboid and columnar." (Brubaker's *Physiology.*)

6. *Cranial nerves:* 1. Olfactory, special sense of smell. 2. Optic, special sense of sight. 3. Motor oculi, motor to some of the muscles of the eye. 4. Trochlear, motor to the superior oblique muscle of the eye. 5. Trigeminal, general sensation to face, and motor to muscles of mastication. 6. Abducens, motor to external rectus muscle of eye. 7. Facial, motor to muscles of face. 8. Auditory, special sense of hearing. 9. Glossopharyngeal, motor and sensory. 10. Vagus, motor and sensory. 11. Spinal accessory, motor. 12. Hypoglossal, motor to muscles of tongue.

7. "The sympathetic nervous system consists of (1) a series of ganglia connected together by a great ganglionic cord, the gangliated cord, extending from the base of the skull to the coccyx, one gangliated cord on each side of the middle line of the body, partly in front and partly on each side of the vertebral column; (2) of three great gangliated plexuses or aggregations of nerves and ganglia, situated in front of the spine in the thoracic, abdominal, and pelvic cavities respectively; (3) of smaller or terminal ganglia, situated in relation with the abdominal viscera; and (4) of numerous fibers." (Gray's *Anatomy.*)

Its *functions*: "It may safely be said that the sympathetic system has, to a great extent, a controlling influence over the secretion of most of the glands, the lacrymal, the salivary, the sweat glands, the glands of the stomach and intestines, the liver, the kidney, etc.; that it presides over the circulation by regulating the caliber of the blood-vessels and the action of the heart; that it influences respiration; and, finally, that all involuntary muscles, those of the digestive apparatus, of the genitourinary system, of the hair follicles (pilomotor nerves), are under its control to such extent that, for instance, in certain mammalians the bladder still continues to fulfill its function for weeks after all the cerebrospinal motor nerves leading to it have been severed. In short, we find that all vegetative life of the organism is, to a greater or less extent, under the control of the sympathetic system. Therefore it may prop-

erly be called the vegetative nerve system *par excellence.*" (*Reference Handbook of the Medical Sciences.*)

8. The *functions of the skin* are: Protection, excretion, secretion, regulation of the body temperature, absorption, sensation, special sense of touch, respiration.

9. The *physical properties of blood:* Fluid, somewhat viscid, red; specific gravity, from 1055 to 1062; alkaline reaction; saltish taste; characteristic odor; variable temperature (average, about 100° F.).

The *constituents of the blood* are plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteids, fat, and inorganic salts). The *white corpuscles* consist of water and solids (proteid, leuconuclein, lecithin, histon, etc.).

The *red blood corpuscles* are biconcave discs, about 1-3200 of an inch in diameter; they are non-nucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They are elastic and soft, and their shape is changed by pressure, but is promptly regained on the removal of the pressure. Their color is yellowish. They contain hemoglobin.

Their *function* is to carry oxygen from the lungs to the tissues.

The white blood cells are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their fate is uncertain; it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their functions are (1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

There are also *platelets*, which are very small, colorless, irregular shaped bodies; they are about one-fourth the diameter of a red corpuscle. Their function is not determined; it is possible that they take some part in the coagulation of the blood. In number they vary from about

200,000 to more than 500,000 in each cubic millimeter of blood.

Plasma conveys nutriment to the tissue; it holds in solution the carbon dioxide and water which it receives from the tissues, and takes them to be eliminated by the lungs, kidneys, and skin; it also holds in solution urea and other nitrogenous substances that are taken to and excreted by the liver or kidneys.

10. The *cardiac cycle* includes all the changes which occur between the commencement of one heart-beat and the commencement of the next; it consists of the alternate contractions (or systole) and relaxations (or diastole) of the auricles and ventricles of the heart. The contraction of the two auricles takes place simultaneously, and is followed by the simultaneous contraction of the two ventricles; then follows a period during which the whole heart is in a state of diastole. The cycle then begins again with the auricular systole.

OBSTETRICS AND GYNECOLOGY.

1. By *presentation* is meant the part of the fetus which presents at the pelvic brim; examples—vertex, breech, face.

By *position* is meant the relation between a point on the fetus and a point on the maternal pelvis; examples—in a vertex presentation the position may be (1) left occipito-anterior, (2) right occipito-posterior, (3) right occipito-anterior, (4) left occipito-posterior.

2. In cases of *shoulder presentation,* if seen before labor, version should be performed to correct the mal-presentation; in case of impaction a Cesarean section is indicated; sometimes decapitation or embryotomy has been performed, but a Cesarean section is preferable. Cases of shoulder presentation have been known to terminate spontaneously, but it is not advisable to rely on this possibility.

3. *Mensuration* is measuring (the pelvis); the same as pelvimetry. The measurements are taken by a pelvimeter, between the anterior superior spinous processes of the iliac bones; the distances between the iliac crests, the inter-trochanteric and the external conjugate. In measuring the above the physician should stand by the side of the patient, and holding the pelvimeter between the thumb and fingers, the points should be applied to the outer sides of the points above mentioned. In measuring the external conjugate, the patient should lie on her side with her face away from the physician.

Between anterior spines	10¼	inches
" the highest points of the iliac crests	11	"
" trochanters	12¼	"

The external conjugate is taken from the fossa just be-

neath the spinous process of the last lumbar vertebra to the middle of the upper border of the symphysis pubis. It is about 8 inches, or 20 cm. This is also sometimes spoken of as Baudelocque's diameter, from its author. (Landis.)

It is of value in indicating a deformed pelvis, and difficult or impossible labor.

4. Puncture the cranium or spinal cord with a perforator, and evacuate the fluid.

5. (*a*) Placenta prævia, or premature separation of a normally situated placenta.

(*b*) and (*c*). Hemorrhage (external, internal or concealed), shock, pallor, air-hunger, rapid and feeble pulse, cyanosis; the case should be managed by dilatation of the os, and prompt delivery (version or forceps) *accouchement forcé.*

6. (*a*) ***Ventrofixation is indicated*** in cases of: Retroflexed uterus, prolapsed uterus.

(*b*)and (*c*). *Ballottement* is a means of diagnosing pregnancy; with a finger in the vagina, a sharp tap is made against the lower uterine segment, the fetus (if present) is tossed upwards, and will presently be felt to strike against the uterine wall, as it falls back. It is valuable at about the 3d to 5th month of pregnancy.

7. "When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility. Nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy. Pains are often very severe, with marked tenderness within the pelvis. Such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating. This tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two fists. (4) The os uteri is patulous; the uterus is displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua, in part or whole. Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs.*" (*American Text-Book of Obstetrics.*)

8. Carcinoma of Uterus.—*Symptoms:* Hemorrhage, leucorrhea, offensive discharge, pain, cachexia, and a tumor. *Pathology:* "Cancer of the body occurs in less than

2 per cent. of all cases. It is more frequent in nulliparæ than carcinoma cervicis, and tends to occur rather later in life than cancer of the cervix. The disease begins superficially or deeply in the mucosa. Epithelioma, malignant adenoma, adeno-carcinoma, and pure carcinoma are found, the latter being of the scirrhous or medullary type. In the malignant adenoma there is an atypical proliferation of the glands; they become folded up irregularly; the intervening connective tissue may be very scant, and the gland spaces may touch at points. They are lined with a single layer of columnar epithelium. In the adeno-carcinoma, parts may show the structure of the malignant adenoma, and parts that of the ordinary cancer where the loculi are filled with epithelial cells. These growths form swellings in the wall. When near the cavity, the mucosa may ulcerate over them. Gradually the uterus becomes excavated. Adhesions may form with adjacent structures, and secondary deposits develop in the peritoneum, ovaries, tubes, vagina, etc. The epithelioma may grow diffusely through the whole cavity, or as an isolated fungoid growth, which may become polypoidal. Metastatic nodules may form in different parts of the uterine wall. These tumors are covered with layers of polyhedral cells; very rarely pavement epithelium is found like that in ordinary epithelioma. The mucosa of the body gets thinned." (Webster.)

9. In the *uterus*, the mucous membrane becomes thick, swollen, red, soft, the uterine glands are enlarged, and the capillaries are hypertrophied and then rupture. In the *ovary*, the most mature follicle, under the influence of congestion secretes more liquor folliculi, swells, the tunica propria falls away, and the follicle ruptures.

10. (a) Two indications for hysterectomy: Carcinoma and fibroids.

(b) As to preference between the vaginal and abdominal routes, the following is taken from Garrigues' *Gynecology*: "If the vaginal route is available, it should be preferred, because it entails much less shock, requires a simple after-treatment, does not leave any visible cicatrix, predisposes less to hernia, and allows the patient to resume work in shorter time. On the other hand, the vaginal route is more difficult on account of the limited space. Hemorrhage is more troublesome to check, adhesions are harder to separate, and the bladder and intestine more exposed to injury and less accessible for repair. The pelvic cavity cannot be seen so well and the abdominal not at all. If tissue is left to mortify, it emits an offensive odor."

CHEMISTRY.

1. (a) An *atom* is the smallest portion of an element

that can enter into a chemical reaction, or that can enter into the composition of a molecule.

(b) A *molecule* is the smallest quantity of any substance that can exist in a free state.

(c) *Isomeric compounds* are compounds which, while differing in properties, possess the same percentage composition.

2. (a) The *symptoms of acute arsenical poisoning*: "In acute cases the symptoms usually begin in from twenty to forty-five minutes. Nausea and faintness. Violent, burning pain in the stomach, which becomes more and more intense, and increases on pressure. Persisting and distressing vomiting of matters, sometimes brown or gray, or streaked with blood, or green (Paris green). Purging. More or less severe cramps in the lower extremities." (Witthaus' *Essentials of Chemistry.*)

(b) The chemical antidote is freshly prepared ferric hydroxide. The ferric hydroxide changes the arsenic into ferrous arsenate, which is nonpoisonous. The reaction is represented by the following equation:

$$As_2O_3+2Fe_2(OH)_6=Fe(OH)_3+5H_2O+Fe_2(AsO_4)_2.$$

(c) *Test for arsenic*: Reinsch's test is as follows: To the suspected fluid add a little pure HCl; suspend in the fluid a small strip of bright copper foil, and boil. If a deposit forms on the copper, remove the copper, wash it with pure water, dry on filter paper, but be careful not to rub off the deposit. Coil up the copper, and put it into a clean, dry glass tube, open at both ends, and apply heat at the part where the copper is. If arsenic is present there will appear in the cold part of the tube a mirror, which will be found on microscopical examination to consist of octahedral crystals of arsenic trioxide.

3. Method for the *quantitative estimation of sugar in urine*: *"Fehling's method.*—The solution is made as follows:

I. Dissolve cupric sulphate	51.98 gm.
in water to	500.00 c.c.
II. Dissolve Rochelle salt	259.9 gm.
in sodium hydroxide soln. sp. gr. 1.12 to 1,000 c.c. (Piffard).	

When required for use, one volume of I. is to be mixed with two volumes of II. The copper contained in 10 c.c. of this mixture is precipitated completely, as cuprous oxid, by 0.05 gm. of glucose.

"To determine the quantity of sugar, place 10 c.c. of the mixed soln. in a flask of about 250 c.c. capacity, dilute with H_2O to about 30 c.c., and heat to boiling. On the other hand, the urine to be tested is diluted and thoroughly

mixed with four volumes of H_2O if it be poor in sugar, or with nine volumes of H_2O if highly saccharine, and a burette filled with the mixture. When the Fehling soln. boils, add a few gtt. NH_4HO and then 5 c.c. of the urine from the burette, boil again, and continue the alternate addition of diluted urine and boiling of the mixture until the blue color is quite faint. Now add the diluted urine in quantities of 1 c.c. at a time, boiling after each addition until the blue color just disappears. Have ready a small filter, and, having filtered through it a few gtt. of the hot mixture, acidulate the filtrate with acetic acid, and add to it 1 gtt. soln. of potassium ferrocyanide. If a brownish tinge be produced, add another ½ c.c. of dil. urine to the flask, boil, and test with ferrocyanide as before. Continue this proceeding until no brown tinge is produced. The burette reading, taken at this point, gives the number of c.c. of dilute urine containing 0.05 gm. glucose, and this divided by 5 or 10, according as the urine was diluted with 4 or 9 volumes of H_2O, gives the number of c.c. of urine containing 0.05 gm. sugar. The number of c.c. urine passed in twenty-four hours divided by 20 times the number of c.c. containing 0.05 gm. glucose, gives the elimination of glucose in twenty-four hours in grams.

Example. Urine in 24 hours = 2,436 c.c.
Fehling's soln. used = 10 c.c.
Urine diluted with 4 vols. H_2O
Burette reading = 18.5 c.c.

$$\frac{18.5}{5} = 3.7 = \text{c.c. urine containing 0.05 gm. glucose.}$$

$$\frac{2{,}436}{3.7 \times 20} = 32.92 = \text{grams glucose eliminated in 24 hours."}$$

(Witthaus' *Urinalysis.*)

4. Test for *bile*: Put 3 c.c. HNO_3 in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquids, which gradually rises, and is succeeded from below by blue, reddish-violet, and yellow.

5. (a) Dairy milk (assuming it to be pure) contains (approximately) 4 per cent. each of proteids, fat, and sugar; whereas in human milk the proteids are about 1 to 2 per cent., the fat about 3 to 4 per cent., and the sugar about 6 to 7 per cent. Dairy milk may be acid in reaction and contains numerous bacteria, whereas human milk is amphoteric or slightly alkaline and generally contains no bacteria.

6. (a) H_2SO_4 is the formula for a molecule of sulphuric acid; (b) BaO_2 for one of barium dioxide; (c) HCl for one of hydrochloric acid; (d) HNO_3 for one of nitric acid.

(e) The formula for methyl alcohol is $H.CH_3OH$.

7. (a) Acetphenetidin (or phenacetin) is ethylpara-acetamidophenate.

(b) Hexamethylene-tetramine is urotropin.

(c) The former is prepared by the action of glacial acetic acid upon paraphenetidin; the latter by the action of ammonia upon formaldehyde.

8. (a) Oxygen is a colorless, odorless, tasteless gas, slightly soluble in water, heavier than air. It has a strong tendency to combine with other elements, and forms binary compounds with all elements except fluorine and bromine. Oxygen is necessary to the processes of life and combustion.

(b) Its symbol is O; (c) valence, two; (d) atomic weight, 16.

(e) Oygen may be prepared by heating potassium chlorate.

$$2KClO_3 = 2KCl + 3O_2$$

9. (a) *Specific gravity* is the weight of any substance as compared with the weight of an equal volume of another substance taken as a standard under like conditions of temperature and pressure.

(*b*) *Specific gravity of solids:* "1. SOLIDS HEAVIER THAN WATER.—First weigh it in air and then in water. The difference is the weight of the volume of water displaced. The weight in air is divided by this figure.

2. SOLIDS LIGHTER THAN WATER.—First weigh it in air, then in water with a sinker attached. The specific weight of the sinker is then determined and subtracted from that of both. The specific gravity is calculated as before.

3. SOLIDS SOLUBLE IN WATER.—The specific gravity is determined in a liquid having no solvent action, the specific gravity of which is known, and the weight of a corresponding volume of water is calculated."

(*c*) *Of Liquids:* "Weigh equal volumes of water and the given liquid and divide the latter by the former.

The *pyknometer* is a flask of thin glass holding accurately when completely filled a given volume at a definite temperature, and is much used for determining specific gravity of fluids.

The *hydrometer* is an instrument used for this purpose, also, and is generally made of glass tubing, weighted below to maintain it upright when floating and with a stem above showing a scale. One form sinks in water to a mark on the scale—usually 1—and the other marks show at once the specific gravity of the fluid, according as the instrument floats above or below or at this level."—(McGlannan.)

(*d*) *Of Gases:* By the specific gravity bottle; or divide the weight of its molecule by two.

10. The ptyalin of the saliva and the amylopsin of the

pancreatic juice act upon boiled starch, and by hydrolysis convert it into soluble starch. By further hydrolytic cleavage, maltose, erythrodextrin, and achroodextrin are formed.

"According to Brown and Heron the reactions may be represented thus:

One molecule of gelatinous starch is converted by the action of an amylolytic ferment into *n* molecules of soluble starch.

One molecule of soluble starch $= 10(C_{12}H_{20}O_{10}) + 8(H_2O)$, which is further converted by the ferment into

1. Erythrodextrin + Maltose.
   $9(C_{12}H_{20}O_{10})$ $(C_{12}H_{22}O_{11})$

then into

2. Erythrodextrin + Maltose.
   $8(C_{12}H_{20}O_{10})$ $2(C_{12}H_{22}O_{11})$

next into

3. Achroodextrin + Maltose.
   $7(C_{12}H_{20}O_{10})$ $3(C_{12}H_{22}O_{11})$

And so on; the resultant being:

$10(C_{12}H_{20}O_{10}) + 8(H_2O) = 8(C_{12}H_{22}O_{11}) + 2(C_{12}H_{20}O_{10})$."

Soluble starch Water Maltose Achroodextrin.

(From Kirkes' *Physiology.*)

NERVOUS DISEASES.

1. *Etiology of migraine*: Heredity, female sex, and age (about the time of puberty) are all predisposing factors; neurotic family history, epilepsy, and hysteria also predispose; overwork at school in conjunction with lowered physical health, eyestrain, injury, shock, fatigue, gout, rheumatism, indigestion, and autotoxemia may all cause migraine.

2. *Etiology of Sciatica.*—Predisposing causes are: gout, muscular rheumatism, syphilis, diabetes, alcoholism, lead poisoning, exposure to cold and wet, neuritis. *Symptoms:* Pain in the course of the sciatic nerve.

3. *Epilepsy* is a disease manifested or characterized by a periodic disorder of consciousness and by muscular convulsions, either of which may be absent in exceptional cases. According to the severity of the condition it is called *petit mal* or *grand mal.* The convulsions may be tonic or clonic, or may alternate. A family history of nervous disorders, alcoholism, or syphilis, poor physique, abnormal and difficult labors, rachitis, malnutrition, the infectious fevers, particularly scarlet fever, intestinal worms, injury to the cranium, and disorders of menstruation are some of the causes of the disease. The pathology is unknown.

(*b*) *Catalepsy:* "A peculiar neurosis characterized by loss of will and muscular rigidity, due to a diseased condition of the central nervous system. It is seen in neurotic indi-

viduals between 20 and 30 years, and is commonly associated with hysteria. It occurs suddenly in paroxysms and usually with loss of consciousness. During the attack external stimulation is necessary. Faradization and emetics are also of value. In the interval the neurotic condition should receive attention."—(Gould and Pyle's *Pocket Cyclopedia.*)

4. *Progressive bulbar paralysis.* "The symptoms consist of the gradual onset and progression of difficulty in articulating, which is especially marked in connection with labials, such as b. p and v, and linguals, such as l, m, r, and t. Soon there is difficulty in swallowing, and fluids regurgitate through the nose, food may pass into the larynx, and the voice takes on a nasal quality and becomes weak. In the course of time the muscles of the lips, lower part of the face, and tongue become paralyzed and atrophied, and exhibit fibrillary twitchings and the reactions of degeneration; the tongue cannot be protruded; the lips cannot be puckered (as in whistling); the saliva drools from the mouth; the palatal, pharyngeal, and laryngeal reflexes lessen and finally disappear; and in the course of several years the patient dies from respiratory or cardiac failure, if he has not earlier succumbed to an intercurrent infection. Intelligence is preserved throughout the course of the disease, and there are no sensory changes. In some cases there is an associated ophthalmoplegia." (Kelly's *Practice.*)

5. A ***delusion*** is a belief in something which has no real existence, but is purely imaginary; and out of which the person cannot be reasoned. An ***illusion*** is a false or perverted impression, received through one of the senses. An ***hallucination*** is the same as an illusion, but without any material basis.

If an individual believes himself to be made of glass, and is afraid of being touched lest he be broken, he is suffering from a ***delusion.*** If the whistling of the wind is mistaken for a voice telling a person to do a certain thing—that would be an ***illusion.*** If a person fancied he heard a voice when there was nothing at all to be heard, that would be an ***hallucination.***

PREVENTIVE MEDICINE.

1. (*a*) *Diphtheria:* About four weeks; but all discharges must have ceased, there must be no albumin in the urine, and bacteriological examination of nose and throat must be repeatedly negative.

(*b*) *Scarlet fever:* About six weeks; when all desquamation, discharge from ears or nose, albuminuria, and sore throat shall have disappeared.

(*c*) *Smallpox:* About six weeks from the beginning; one week after every scab has disappeared.

2. Air-passages, mouth (with food and drink), wounds in skin and mucous membranes.

3. All water for drinking or for washing dishes, etc., and milk should be boiled; no ice should be put *in* water or other drink or food; flies should be kept out of the house; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed, and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over.

4. *To disinfect a room by formaldehyde:* (1) By Trillat's apparatus, which "allows the solution of formalin to flow in a fine stream through a copper coil heated to redness by a flame beneath, and the gas and vapor passing directly into the room. The apparatus may be operated outside of a room, and the amount of gas liberated depends directly upon the strength and quantity of the solution evaporated. (2) in Schering's method the solid paraform is heated in a receptacle over an alcohol lamp, and is especially valuable in disinfecting small rooms, closets, etc. (3) The cheapest and most common form develops the gas directly by the oxidation of methyl alcohol, the vapors of the latter passing over or through tubes or coils of heated metal. The amount is uncertain and results indefinite. (Gould and Pyle's *Cyclopedia of Medicine and Surgery.*)

5. A *contagion* is an infectious disease in which the causative microorganism is readily communicable from person to person by mediate or immediate contact.

An *infection* is a disease due to a microorganism.

PRACTICE.

1. *Constipation* is abnormal or prolonged retention of feces, or habitually infrequent evacuation of the bowels. *Causes:* Constitutional, habit, neglect of exercise, certain disease (hysteria, anemia, neurasthenia, disorders of heart or liver, insanity, lesions of spinal cord(improper or improperly prepared food, insufficient water. *Prognosis* depends on the cause and the length of time it has lasted. Generally it should be curable.

2. *Vertigo* is a disturbance of the sense of equilibrium, a condition in which the patient or objects surrounding him appear to be in a state of rotation or oscillation. It is not a disease; but is a symptom of many pathological conditions.

The chief *varieties* are: (1) Auditory, or labyrinthine, also called Menière's disease; (2) cerebral; (3) gastric; (4) toxic; (5) senile; (6) hysterical; (7) essential.

The *diagnosis* is based on the history of the case, the etiology and the absence of unconsciousness and of convulsive movements. It is to be differentiated from epilepsy, in which the patient is unconscious and also has convulsive movements.

3. *Myxedema* is a disease associated with atrophy of the thyroid, a peculiar condition of the skin, overgrowth of subcutaneous tissue and mental disturbance. *Cause* of the thyroid atrophy is unknown; poorer classes, and women between 30 and 55 most frequently affected. Patient has a stolid countenance, face pale, but cheeks often swollen and flushed; speech is slow and thick; there is intolerance of cold; skin is dry, thick and scaly; temperature subnormal; gait is clumsy; mental condition is impaired. The disease may last 10 years, and death is generally the result of some intercurrent malady.

4. *Hydrothorax* is the presence of liquid in the pleural cavity. Due to dropsy from kidney or heart disease. Characterized by dyspunea, dullness over the fluid, absence of vocal fremitus, absence of vesicular murmur. Prognosis depends on the cause.

5. *Angina pectoris* is a paroxysmal affection, characterized by agonizing pain over the region of the heart, faintness and anxiety; of more or less sudden onset, and associated with a dread of impending death.

Due to arterio-capillary fibrosis with myocarditis; coronary arteries generally involved. Prognosis very bad. Diagnosis is generally made from the history of the attack.

6. *Asthma* is a paroxysmal expiratory dyspnea. It is supposed to be due to a diminution in the caliber of the smaller bronchial tubes; the cause is unsettled. It generally comes on suddenly at night; patient sits at open window or seeks the air; expiratory efforts are violent; there is wheezing, pale or livid face, anxious expression. Speech is impossible, pulse small and feeble, may last from a few minutes to several hours. Never fatal by itself.

7. *Adenoids* are hypertrophied adenoid tissue in the nasopharynx.

Causes: The real cause is unknown, but the condition is generally observed in childhood; heredity is also supposed to be a factor; males are more frequently affected than females; malnutrition and scrofula seem to be causative factors; the condition is often associated with enlarged tonsils, enlarged cervical glands, hypertrophy of the nasal mucous membrane, deviations of the septum, spurs; it often follows some of the acute infectious diseases.

Symptoms: Mouth-breathing; snoring; open-mouth; a

vacant, dull expression of the face; modification of the voice (nasal twang), with inability to pronounce certain letters.

Effects: Earache and other ear affections; mental deficiency; frequent attacks of coryza; nose-bleed; stunted growth; convulsions, laryngismus stridulus, and various other neuroses may also be noticed.

8. *Enterocolitis* in a child is an inflammation of the ileum and colon, appearing during the summer months or period of teething, and is generally due to improper food, summer weather, sudden changes in temperature, and micro-organism. Diarrhea, watery and colorless or green, and of musty odor, is the chief symptom; high fever, thirst, restlessness, vomiting and purging may be present; the child wastes, urine is scanty, child may become apathetic, and pass into convulsions and die.

9. *Essentials for the production and preservation of pure dairy milk:* Vaughan's rules are as follows: "(1) The cows should be healthy, and the milk of any animal which seems indisposed should not be mixed with that from the healthy animals. (2) Cows must not be fed upon swill or the refuse from breweries or glucose factories, or upon any other fermented food. (3) Milch cows must not be allowed to drink from stagnant pools, but must have access to fresh, pure water. (4) The pasture must be freed from noxious weeds, and the barn and yard must be kept clean. (5) The udders should be washed and then wiped dry before each milking. (6) The milk must be at once thoroughly cooled. This is best done in the summer by placing the milk can in a tank of cold water or ice water, the water being of the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing, and this will be necessary unless ice water is used. The tank should be thoroughly cleaned each day to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60° F., or lower, within an hour. The can should remain in cold water till ready for delivery. (7) Milk should be delivered during the summer in refrigerated cars or in bottles about which ice is packed during transportation. (8) When received by the consumer it must be kept in a clean place, and at a temperature some degrees below 60° F."

10. *Meningitis* (cerebro-spinal) is an acute infectious disease, of sudden onset. Due to diplococcus intracellularis meningitidis. Headache, vomiting, convulsions, and high temperature are present. Pulse is rapid, then slow; respirations short and quick, then irregular and Cheyne-Stokes; muscles of the back become rigid. Babinski's sign and Kernig's sign are present.

OTOLOGY.

1. *The Politzer Method.*—"In using this mode of inflation the patient is directed to take a sip of water from a glass and retain it within the mouth until instructed by the physician by word or sign to swallow. The nozzle of a Politzer airbag (Fig. 51) is placed snugly into one nostril, while the other is held firmly closed. The patient then swallows at the given signal, and the air-bag is simultaneously compressed, when, if the soft palate rests tightly enough against the pharyngeal wall, the air makes its passage up the Eustachian tube into the tympanum, as may be heard by the auscultation test. Instead of employing the act of swallowing to close the pharyngeal space, the patient may be instructed to forcibly pronounce the word 'hook,' prolonging the 'k' sound, or markedly distend the cheeks in an attempt at forced expiration, when the air-bag may be used as previously indicated."—(Alling and Griffin.)

2. Tinnitus aurium is the name given to any subjective sounds heard in the ear. The chief causes are: Neurasthenia, impacted cerumen, otitis, and other ear diseases; Menière's disease, obstruction of the Eustachian tube, anemia, leukemia, cerebral hyperemia and anemia, arteriosclerosis, gout, digestive disorders, excessive use of alcohol or tobacco, and the use of certain drugs such as quinine or salicylic acid.

3. *Acute catarrhal otitis media* is frequently caused by acute coryza and the infectious fevers. There is a painless obstructed sensation in one or both ears, impairment of hearing, and tinnitus. The inflammation causes closure of the Eustachian tube. Inflation and aspiration of the middle ear and syringing and douching the nares and nasopharynx must be avoided.

"Acute purulent otitis media: Acute catarrhal otitis media, instead of undergoing resolution, may pass into acute purulent otitis media (especially in exanthemas) from the passage of pathogenic germs from the nasopharynx into the middle ear. The pain will become more intense, the hearing dull; tinnitus will become louder and more distressing, and fever usually sets in.

4. The pyramid of light is a reflection of light from the anterior inferior quadrant of the membrana tympani. It is roughly triangular in shape, and its apex touches the tip of the manubrium of the malleus, while its base lies on or near the periphery of the membrana tympani.

5. ACUTE MASTOIDITIS. *Symptoms*: Tenderness, pain, swelling and redness over the mastoid; bulging of the superior and posterior parts of the auditory canal; temperature variable, from normal up to about 104° F. *Etiology.* Spread of inflammation from middle ear, it may

follow some of the infectious diseases. Infection may come from the nasopharynx or through the blood or lymph channels. *Results* may be infection of sinus, cerebral abscess or suppuration, septic infection.

BACTERIOLOGY.

1. *To determine the presence of malarial parasite:* A few hours before the chill, a drop of blood should be taken from the cleansed lobe of the ear or tip of the finger of the patient. The blood should be received on the center of a cover-glass, which should then be quickly placed, blood-side down, on a slide. Search should be made with a one-twelfth oil immersion objective, and but little illumination. The ordinary tertian parasite appears as a small, pale, and ring-like body within the red corpuscles; it has an active vibratile motion; sometimes a dark pigment is present, and segmenting bodies or rosettes may be seen.

TERTIAN.	QUARTAN.	ESTIVO-AUTUMNAL.
Cycle in man 48 hours.	3 days.	24-48 hours.
Ameba in red cell active.	Sluggish.	Smaller than tertian.
Decolorizes red cell rapidly.	Slowly.	Hemoglobin deeper in tint.
Causes red cell to swell.	Size preserved or diminished.	Red cells shrivel.
Outlines not sharply defined.	Sharp.	
Pigment in fine granules, abundant, in motion.	Coarser, fewer.	Pigment in fine peripheral granules, not often in motion.
Spores 15-20, usually 18, small.	6-12, larger.	Small, 6-30, usually 18.
Flagella more numerous.		Less numerous.
Ring forms common, early, more distinct than those of estivo-autumnal.		Common, ring and disk form less distinct.

—(Thayer.)

2. (a) The Widal test for typhoid fever "depends upon the fact that serum from the blood of one ill with typhoid fever, mixed with a recent culture, will cause the typhoid

bacilli to lose their motility and gather in groups, the whole called 'clumping.' Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. . . . A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps, and cease their rapid movement inside of twenty minutes." (From Thayer's *Pathology.*)

(b) Its diagnostic value is believed by some to be great; others place little reliance on it. It may be absent in cases of typhoid fever; it may be present for several months after an attack of typhoid; the reaction may not be obtained till the third week of the disease; it may be present in other diseases or in perfectly healthy persons. The above have all been urged as objections; certainly only positive results have any value at all.

3. The cultural and microscopic points of difference between the *Bacillus coli communis* and the *Bacillus typhosus* (of Eberth) are:

"(1) The motility of the colon bacillus is, as a rule, not very pronounced, sometimes absent; that of the typhoid bacillus is usually very active.

"(2) On gelatine plates the colon bacillus develops more rapidly and luxuriantly than the typhoid bacillus, and on potato it grows more abundantly, being almost always visible.

"(3) The colon bacillus coagulates milk with acid reaction within twenty-four to forty-eight hours; the typhoid bacillus does not coagulate milk.

"(4) The colon bacillus causes fermentation with production of gas in media containing sugar; the typhoid bacillus does not.

"(5) In nutrient agar or gelatine containing lactose and litmus tincture and of a slightly alkaline reaction, the color of the colonies of colon bacillus is pink and the surrounding medium red; while the colonies of typhoid bacillus are blue and there is little or no reddening of the medium.

"(6) The colon bacillus produces indol in cultures of bouillon or peptone; the typhoid bacillus does not.

"(7) When a twenty-four-hour-old bouillon culture of the colon bacillus is mixed with the blood or serum of a patient suffering from genuine typhoid fever, in a dilution of one to ten or more, after the first week of the disease, the Widal reaction is negative; cultures of the typhoid bacillus treated in the same manner and examined in the hanging drop give the characteristic agglutination and clumping of the bacilli." (*Reference Handbook of the Medical Sciences.*)

4. The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue.

5. (a) *Toxins* are the poisonous products of pathogenic bacteria.

(b) *Antitoxins* are substances formed in the body, of a protective character, and capable of rendering inert the poisonous products of bacteria.

(*c*) *Amboceptors* are antibodies having a double combining affinity; one linking on to the cell to be destroyed, and the other linking on to the alexin or complement.

(*d*) *Bacterioproteins* are proteins contained in bacteria.

(*e*) *Lysins* are bacterial products which are capable of destroying alexins and so promote the growth of the bacteria.

6. The bacillus of tetanus is characterized by its peculiar spore, formed at one end of the bacillus, and giving it the appearance of a pin; it is purely anaërobic, and cannot be developed at all in the presence of oxygen. It generally comes from the soil, and is found in penetrating wounds. It appears in two forms, the spore-bearing form, as described above, and the vegetative form, which is a short bacillus with rounded ends, and which may occur singly or in pairs, or may form long filaments. It grows in gelatin stab cultures in the middle of the medium, and the colonies look something like a fir tree; its growth is slow, and a disagreeable odor is at the same time emitted. In bouillon, it grows near the bottom of the tube, and produces gases.

Its *toxins*, are: Tetanospasmin, tetanolysin, tetanotoxin, tetanin, and another (without a name).

7. To demonstrate *gonococci* in a urethral discharge: On a cover-glass make a smear with the discharge as thin

as possible, and let it dry in the air; cover it with a freshly made solution of anilin-oil-gentian-violet for one or two minutes; wash it in distilled water; leave it in Gram's solution for two minutes; wash it in 95 per cent. alcohol until decolorized; wash it in distilled water; counterstain with a dilute carbolfuchsin without heat, or with a saturated aqueous solution of Bismarck brown; wash in distilled water, dry with filter paper, mount, and examine with an oil-immersion lens. The gonococci will appear as *diplococci within the leucocytes,* which have been *decolorized by Gram's stain,* and have taken the counterstain.

8. Several theories have been advanced to account for immunity, but the only two that are considered now are: (1) Metchnikoff's theory of phagocytosis and (2) Ehrlich's side-chain theory. This latter "is based on the idea that the toxin destroys a cell by entering into chemical union with it. The molecule of toxin contains at least two groups of atoms, a *toxophore* group, in which the poisonous principle resides, and a *haptophore* group, which brings the toxophore group into touch with the cell and through which chemical combination takes place. Similarly, the cell contains a haptophore group, but the toxophore group of the toxin can only unite with it and destroy it when its haptophore companion has affinity with that of the cell. If that affinity does not exist the two haptophore groups do not unite, the toxophore group does not come into contact with the cell, and the animal is immune. Such is natural immunity. If there is affinity and the cell can throw off a haptophore group (antitoxin), which in its detached condition unites with the haptophore group of the toxin, the toxophore group has then nothing with which it can unite and the animal is immunized. When the individual has to contend with a bacterium as well as its toxin, the same principle obtains. Immunity is established by the production of a double haptophore group, one for the bacterium, the other for its toxin."—(Stenhouse's *Pathology.*)

9. The *pneumococcus* is an encapsulated bacillus, nonmotile, non-flagellated, aërobic, non-liquefying, non-sporogenous, non-chromogenic, staining by ordinary methods, but Gram-negative.

Pfeiffer's bacillus of influenza is very similar in properties, but it is exceedingly small, and is not encapsulated.

10. Phagocytosis is the faculty of certain cells (notably the mononuclear and polynuclear leucocytes) to take up and destroy bacteria. It has a protective function.

STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF MARYLAND.

ANATOMY.

1. Describe the occipital bone.
2. Name the carpal bones.
3. Name varieties of articulations—give example of each.
4. Give origin and distribution of great sciatic nerve.
5. Give origin, insertion, and nerve supply of quadratus lumborum, brachialis anticus, orbicularis palpebrarum and sartorius.
6. Describe the epithelium of the pharynx.
7. What glands are in the small intestines and where located.
8. Describe a villus. What is its function?
9. What arteries form the circle of Willis?
10. What and where is the pituitary body?

PHYSIOLOGY.

1. What is meant by the physiological effect of a drug?
2. Into what general classes are foods divided? (*b*) Give examples of each.
3. What effect has starvation upon the proteins?
4. What is animal heat? (*b*) What relation exists between the temperature of the body and the pulse? (*c*) What is the difference between warm and cold blooded animals?
5. What is meant by nerve cells and nerve fibers? (*b*) Define afferent, efferent, trophic, inhibitory, motor, and vasomotor nerve fibers.
6. What is meant by diffusion and osmosis?
7. What is meant by absorption and nutrition?
8. Which organs of the body secrete and which excrete?
9. Describe the method of producing artificial respiration?
10. What is the composition of: Saliva, gastric juice, blood, and urine?

MATERIA MEDICA.

1. Iodine; how obtained. (*b*) The official preparations.
2. What is black wash? Yellow wash? (*b*) What are wines? (*c*) What is the difference in the preparation of lozenges, tablets, and triturates? Name some of the official lozenges.
3. What is the difference between anesthetics and anodynes? Name some of each most generally used? (*b*) What is the difference between liniments and lotions? Name some of the official.
4. Give the average dose of tincture of aconite, tincture

of nux vomica, tincture of digitalis, tincture of opium, tincture of veratrum.

5. To what class of drugs does bismuth belong? What are the official preparations and doses?

6. What is the difference between irritants and counter-irritants? Name the most important.

7. Name six preparations of iron and their doses. (*b*) What are the incompatibles of iron?

8. Write a prescription containing: Iron, arsenic, strychnine, and quinine, using the official terms and state when best administered.

9. Write a prescription containing: Tincture of aconite, sweet spirit of niter, spirit of Mindererus, using the official terms.

10. Silver: its official preparations and doses. What are the incompatibles of silver?

THERAPEUTICS.

1. Give therapeutics of hypodermoclysis and method of administration.

2. Write a prescription in Latin, without abbreviation, containing four ingredients which you would use for an acute bronchitis and give directions for using same.

3. Write a prescription in Latin, without abbreviation, containing three ingredients which you would use for diarrhea and give directions for using same.

4. Give the therapeutics of eserine and usual method of administration.

5. Give therapeutic uses of three zinc salts and name antidotes for zinc poisoning.

6. Name the official preparations of oxygen and give their therapeutic uses.

7. Give the therapeutics of three preparations of ammonium and name them.

8. What is meant by a "gastric tonic" or "stomachic?" Give indications for use and mode of action.

9. Give the therapeutics of H_2O, hot and cold.

10. Give the physiological action and therapeutics of aconitum.

CHEMISTRY.

1. Define: (*a*) reagents; (*b*) valence; (*c*) crystalloid; (*d*) colloid; and (*e*) atom.

2. Give the chemical name and composition of "laughing gas," how it is obtained, and what are its properties?

3. Give one chemical antidote for each of the following: (*a*) antimony; (*b*) lead acetate; (*c*) cocaine; (*d*) morphine; and (*e*) phenol.

4. Describe in detail the examination of a sample of urine for the detections of bile, sugar, and albumin.

5. (*a*) What are metals? (*b*) What are nonmetals? (*c*) What are amalgams? and (*d*) What are indicators?

6. Give the chemical formula of each of the following: (*a*) Nitric acid; (*b*) boric acid; (*c*) sodium bromide; (*d*) zinc oxide; and (*e*) calomel.

7. What is glycerine? What is its source in nature? How is it obtained and what are its properties?

8. (*a*) What is an alcohol; (*b*) what is an alkaloid; (*c*) what is a salt; and (*d*) what is a hydrocarbon?

9. Give the "Law of constancy of composition."

10. Complete the following equation:

$NH_3 + HCl =$
$MgO + H_2SO_4 =$
$2KOH + H_2SO_4 =$
$NaOH + HCl =$
$Na_3PO_4 + 3AgNO_3 =$

PATHOLOGY.

1. Ascaris lumbricoides; describe briefly life cycle and characteristics; mention two or more dangerous conditions brought about by infection with this parasite.

2. Mention at least four varieties of ulceration seen in the gastrointestinal wall. Describe the gross appearance of an amebic ulcer.

3. What are the dangers inherent to diseased tonsils?

4. What is meant by active congestion? Passive congestion? Give an example of each.

5. Trace the probable course of events which follow chronic obstruction of the urethra.

6. Given a slide supposed to be smeared with gonorrheal pus: How would you proceed to establish the fact?

7. On what principle does vaccination against typhoid fever depend? How is the vaccine prepared?

8. Describe the process of repair in an uninfected fracture of bone.

9. Describe the exudate in a pneumonic lung in the stage of red hepatization.

10. Define, explain, and give examples of exudate and transudate.

PRACTICE.

1. Define: (*a*) Von Graefe's sign, (*b*) uremia, (*c*) arteriosclerosis, (*d*) cirrhosis of the liver, (*e*) angina pectoris.

2. Define: (*a*) dysphagia, (*b*) hematuria, (*c*) hemoptysis, (*d*) laryngismus stridulus, (*e*) pertussis.

3. What diseases most commonly occur in the right inguinal region?

4. Differentiate neuritis and rheumatism.

5. Differentiate diphtheria and acute follicular tonsillitis.

6. Differentiate rubella, rubeola, and scarlatina.
7. Differentiate intestinal colic, uterine colic, and renal colic.
8. Give treatment of angina pectoris.
9. Give treatment of lobar pneumonia.
10. Give treatment of acute dysentery.

OBSTETRICS.

1. Name the sutures of the fetal head.
2. What precautions should be taken against septic infection during labor?
3. Indications for use of forceps and mode of application.
4. What are the objections to the use of ergot and stimulants in labor?
5. How would you prevent perineal tears during labor and delivery?
6. What are the varieties of placenta prævia?
7. Outline the care of the navel.
8. Describe some of the best substitutes for mother's milk.
9. What are the different forms of endometritis?
10. Mention the varieties of vaginitis and their treatment.

SURGERY.

1. Name the varieties of fractures of vault of cranium. Prognosis and treatment.
2. Name the different varieties of fractures, their etiology, symptoms, and complications.
3. Give a classification of dislocations with the etiology, predisposing cause, and anatomic peculiarity of each.
4. Give indications for operative treatment of fractures.
5. Give the early diagnosis of exophthalmic goiter.
6. Differentiate between obstruction of common and cystic ducts.
7. Describe glaucoma: Give signs and treatment.
8. Define hematoma, aneurysm, thrombus, and embolus.
9. Indications and contraindications for salvarsan in treatment of syphilis. Technique of your method of administration.
10. Causes and treatment of acute otalgia.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

BOARD OF MEDICAL EXAMINERS OF MARYLAND.

ANATOMY.

1. The *occipital bone* forms the posterior inferior portion of the cranium. It presents two surfaces, four angles,

and four borders. The external and posterior surface is irregularly convex and presents: The occipital protuberance for insertion of ligamentum nuchæ, and descending from which to the foramen magnum is the occipital crest; on either side, above and below are the superior and inferior curved lines for the attachment of muscles. In front it presents a large aperture, the *foramen magnum,* transmitting the medulla oblongata and its coverings, the vertebral arteries, and the spinal accessory nerves.

A little in front and on either side of the foramen magnum are the condyles for articulation with the atlas, the inner border of each condyle presenting a *tubercle* for the check ligament. Externally to each condyle are the *jugular processes.*

In front of the foramen magnum is the *basilar process,* articulating with the sphenoid bone, and grooved on its under surface by the *pharyngeal spine* for the insertion of the tendinous raphé and superior constrictor of the pharynx.

The *internal surface* is irregularly concave and divided by a *crucial ridge,* into four fossæ, the upper, for the posterior lobes of the cerebrum, and the lower, for the lateral lobes of the cerebellum. Its center is marked by an eminence, the *internal occipital protuberance,* which is hollowed out to correspond to the *torcular Herophili.*

The upper division of the crucial ridge affords attachment for the falx cerebri, being grooved for the great longitudinal sinus; the lower extremity affords attachment for the falx cerebelli, being grooved for the occipital sinus; and the lateral divisions afford attachment for the tentorium cerebelli and are grooved for the lateral sinuses. In front of the foramen magnum is the basilar groove, lodging the medulla oblongata and part of the pons Varolii. The *superior angle* articulates with the parietal bones the *inferior angle* articulates with the sphenoid, and the *lateral angles* are wedged in between the mastoid portion of the temporal and the posterior inferior angle of the parietal.—(Young's *Anatomy.*)

2. *The carpal bones* are arranged in two rows, those of the upper row (enumerated from the radial to the ulnar side), are: Scaphoid, semilunar, cuneiform, and pisiform; those of the lower row (enumerated similarly) are: Trapezium, trapezoid, os magnum, and unciform.

3. VARIETIES OF ARTICULATION. 1. *Diarthrodial,* or freely movable; as hip and knee. 2. *Amphiarthrodial,* or slightly movable; as symphysis pubis and joints between bodies of vertebræ. 3. *Synarthrodial,* or immovable; as ethmoid with vomer and parietal with frontal.

4. *The great sciatic nerve* arises from the sacral plexus, and passes out of the pelvis through the great sacrosciatic

foramen, below the pyriformis muscle; it extends down the back of the thigh, passing between the great trochanter of the femur and the tuberosity of the ischium; at the lower third of the thigh it divides into the internal and external popliteal nerves. It supplies the hip-joint and the biceps, semitendinosus, semimembranosus, and adductor magnus *muscles.*

5. QUADRATUS LUMBORUM. *Origin*: From iliolumbar ligament, crest of ilium, and transverse processes of three or four lower lumbar vertebræ. *Insertion:* Into lower border of twelfth rib and transverse processes of four upper lumbar vertebræ. *Nerve supply*: Anterior branches of lumbar nerves. BRACHIALIS ANTICUS. *Origin*: Lower half of outer and inner surfaces of the shaft of the humerus, covering insertion of the Deltoid, and intermuscular septa. *Insertion*: Rough depression on the anterior surface of the coronoid process of the ulna. *Nerve supply*: Musculocutaneous and musculospiral.

ORBICULARIS PALPERBARUM. *Origin:* Internal angular process of frontal bone, from frontal process of superior maxillary bone, and from tendo oculi. *Insertion:* It surrounds the orbit. *Nerve supply:* Facial nerve.

SARTORIUS. *Origin*: Anterior superior spine of ilium, and part of notch below. *Insertion*: Inner side of tibia near tubercle. *Nerve supply*: Middle cutaneous, or branch from anterior crural.

6. The epithelium of the pharynx in the lower part is stratified squamous, and in the upper part stratified ciliated. It rests upon a basement membrane.

7. In the *duodenum* are: Brunner's glands, Lieberkuhn's glands; in the *jejunum and ileum* are: Lieberkuhn's glands, Brunner's glands (in first part of jejunum), solitary glands, and Peyer's patches.

8. A *villus* is a very small vascular process projecting from the mucous membrane of the small intestine. It consists of a lacteal, blood-vessels, epithelium, basement membrane and lymphoid tissue. Its *function* is the absorption of fat.

9. The *Circle of Willis* is formed: In front by the two anterior cerebral arteries (branches of the internal carotid), which are connected by the anterior communicating artery; behind, by the two posterior cerebrals (branches of the basilar artery), which are connected to the internal carotid on each side by the posterior communicating artery.

10. The pituitary body is a ductless gland consisting of two distinct portions which differ in structure and also in function. It is situated on the sella turcica of the sphenoid bone.

PHYSIOLOGY.

1. By the *physiological effect* of a drug is meant the effect that the drug exerts upon the various bodily organs or tissues in health.

2. *Foods are divided into*:

I. Inorganic. { Water. / Salts.

II. Organic. { Non-nitrogenous. { Carbohydrates. / Fats. / Nitrogenous—Proteins.

Examples of each: *Carbohydrate,* sugar and starches; *Fat,* fat of meat, and butter; *Protein,* flesh of animals, and white of eggs; *Salt,* sodium chloride, and calcium phosphate.

3. *Effect of Starvation on the proteids.* At first the body lives on the proteids derived from previous food; then on the proteids of the tissues. The nitrogen excreted rapidly falls in amount, and soon reaches a minimum. When the fat of the animal has been used up, there is a rise in the nitrogen excreted, and this is followed by a rapid fall, as death approaches.

It is believed that the proteids (during starvation) pass into solution in the blood and are thus used to nourish the body and to supply the heat necessary to maintain the body temperature.

4. *Animal heat* is the heat produced in living organisms by the processes of oxidation. Normally a body temperature of 98° F. corresponds to a pulse of 60; 99° F. to a pulse of 70; and in most cases a rise of 1° F. is attended by an increase of 8 to 10 pulse beats per minute.

Warm-blooded animals are such as have a fairly constant body temperature independently of the temperature of the medium in which they live.

Cold-blooded animals are such as have a body temperature which varies according to that of the medium in which they live.

5. *A nerve cell* is the cell body of a neuron.

A *nerve fiber* is a process of a nerve cell, which conducts impulses.

An *afferent nerve* is one that conveys impulses from the periphery to the brain (or the center).

An *efferent nerve* is one that conveys impulses from the brain (or the center) to the periphery.

A *trophic nerve* is one that conveys efferent impulses which govern the nutrition of some organ or tissue.

An *inhibitory nerve* is one that conveys efferent impulses which restrain or inhibit the action of some organ.

A *motor nerve* is one that conveys efferent impulses to muscles, thus causing and regulating their contraction.

A *vasomotor nerve* is one that conveys efferent impulses to the muscular tissue of blood vessels, thus regulating the amount of blood conveyed to a part.

6. "The term *diffusion* has long been applied to the regular mixing of the molecules of two gases when brought into contact in a confined space. More recently it has been applied to the mixing of the molecules of two solutions when brought into contact. If, however, the two solutions are separated by a membrane, permeable to the solutions, diffusion will still occur. To this form of diffusion the term *Osmosis* has been applied in the case of water, and *Dialysis* in the case of diffusible substances. All bodies can be divided into two groups, *crystalloids* and *colloids*. To the former group belong bodies having a crystalline form, which readily go into solution in water. All such bodies are diffusible (dialyzable), their power of dialysis, however, varying considerably. To the second group belong such bodies as have no crystalline form (amorphous). These are generally bodies with a large molecule, which form colloidal suspensions in water, and are only slightly or not at all diffusible. An exception to this second group is hemoglobin, which has a very large molecule but is crystalline and is diffusible."—(Kirkes' *Physiology.*)

7. *Absorption* is the process by which the products of digestion are conveyed to the circulation. *Nutrition* is the sum of the processes by which the body digests, absorbs, and assimilates suitable materials brought into contact with it.

8. (*a*) *Structures of excretion*: Lungs, kidneys, intestines, skin. (*b*) *Structures of secretion*: Serous and synovial membranes; mucous membranes (glands in mouth, stomach, and intestines); salivary glands and pancreas; liver; mammary glands; lacrymal glands; kidneys; skin; testes.

9. *Sylvester's method of artificial respiration* is performed by grasping the arms of the patient lying prone—or, better, with head lower than the body—above the elbows, drawing the arms steadily upward above the head, and keeping them so stretched for from 3 to 4 seconds. Next turn the arms downward, and press them firmly against the sides of the chest from from 2 to 3 seconds. These movements are to be repeated from 15 to 20 times a minute, with perseverance, if needful for from 1 to 2 hours. An assistant may aid by pressing upon the lower ribs and the diaphragm at the same time that compression is made by the arms. If much congestion exists about the head and face, the external jugular vein may be opened. When

natural respiration has been established, a warm room, a warm bed, an enema of brandy and beef-tea may be employed, and but little water given by the mouth. (Gould and Pyle's *Pocket Cyclopedia.*)

10. *Saliva* consists of water and solids (mucin, ptyalin, a protein, potassium thiocyanate, sodium chloride, sodium carbonate, calcium phosphate, calcium carbonate, magnesium phosphate, potassium chloride.

Gastric juice contains: Water, pepsin, rennin, hydrochloric acid, chlorides (of calcium, sodium, and potassium), and phosphates (of calcium, magnesium, and iron).

Blood is composed of plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteids, fat, and inorganic salts).

The *white corpuscles* consist of water and solids (proteids, nuclein, lecithin, histon, etc.).

Urine is composed of: Water; urea, uric acid, urates, hippuric acid, kreatin, kreatinin, xanthin, hypoxanthin; sulphates, chlorides, and phosphates of sodium and potassium; phosphates of magnesium and calcium; nitrogen, and carbon dioxide.

MATERIA MEDICA.

1. *Iodine* is obtained from the ashes of sea weed or kelp. Kelp contains iodine in the form of sodium iodide. This is treated with sulphuric acid and distilled with manganese dioxide:

$$2NaI + 2H_2SO_4 + MnO_2 = MnSO_4 + Na_2SO_4 + 2H_2O + I_2$$

The *official preparations of iodine* are: The tincture, the compound solution, and the ointment.

2. *Black wash* is a lotion containing calomel in lime water.

Yellow wash is a lotion containing corrosive sublimate in lime water.

Wines are liquid preparations containing the soluble principles of medicinal substances dissolved in wine.

Lozenges contain mucilage of tragacanth or adhesive paste.

In *tablets* the adhesion of the particles is due to the use of a volatile liquid like alcohol.

In *tablets* the basis is generally powdered sugar.

In *triturations* the basis is sugar of milk.

Official lozenges: Troches of tannic acid, of ammonium chloride, of cubeb, of gambir, of glycyrrhiza and opium, of krameria, of potassium chlorate, of santonin, and of sodium bicarbonate.

3. *Anesthetics* destroy sensation; *anodynes* relieve pain by depressing the centers of sensation in the cerebrum or

by impairing the conductivity of sensory nerves. The *anesthetics destroy* sensation (for a time); *anodynes diminish* sensation.

Anesthetics: Ether, chloroform, nitrous oxide, ethyl chloride, cocaine, eucaine, ice.

Anodynes: Opium, morphine, cannabis indica, acetanilid, aconite, veratrin, phenol, chloral hydrate.

Liniments are solutions of medicinal agents in oily liquids or in alcoholic liquids containing fatty oils.

Lotions contain medicinal agents, usually in water, with (sometimes) alcohol or glycerin.

Official liniments: Linimentum ammoniæ, L. belladonnæ, L. Calcis, L. camphoræ, L. chloroform, L. saponis, L. saponis mollis, and L. terebinthinæ.

There are no official lotions.

4. AVERAGE DOSE: Tincture of aconite, 10 minims; tincture of nux vomica, 10 minims; tincture of digitalis, 15 minims; tincture of opium, 8 minims; tincture of veratrum, 15 minims.

5. *Bismuth* is classed as an astringent.

The official preparations (with doses) are: The citrate, dose 2 grains; bismuth and ammonium citrate, 2 grains; the subcarbonate, 7½ grains; the subgallate, 4 grains; the subnitrate, 7½ grains; and the subsalicylate, 4 grains.

6. *Irritants* are substances which, when applied to the skin, produce vascular excitement; when used to produce a reflex influence on some part remote from the site of their application they are called *counterirritants. The chief are:* Mustard, capsicum, chloroform, iodine, oil of turpentine, croton oil, cantharides.

7. *Six preparations of iron, with their doses:* Reduced iron, 1 grain; ferrous sulphate, 3 grains; pills of ferrous carbonate, 2 pills; tincture of ferric chloride, 8 minims; Basham's mixture, 4 drams; pyrophosphate of iron, 4 grains.

Incompatibles: Acids, acid salts, alkalies and their carbonates, and vegetable astringents.

8. ℞. Arseni trioxidi, gr. ss.
Strychninæ sulphatis, gr. j.
Ferri reducti, ℥ss.
Quininæ bisulphatis, ℥j. M.
Fiat massa in pilulas no. xxx dividenda.
Sig: Take one after each meal.

9. ℞. Tincturæ aconiti, ℥iij.
Spiritus ætheris nitrosi, ℥iij.
Liquoris ammonii acetatis, q.s. ad ℥vj. M.
Sig: Take two teaspoonfuls in water every three hours.

10. SILVER. *Official preparations and doses:* The nitrate, dose 1/5 grain; the oxide, 1 grain; and the cyanide, moulded

nitrate, and mitigated nitrated, which are not taken internally.

Incompatibles: "Incompatible with the ***nitrate*** are: Acetates, alkalies, alcohol, antimony salts, arsenites, bromides, carbonates, chlorides, chromates, creosote, cyanides, copper salts, ferrous sulphate, glucose, hypophosphites, iodides, morphine salts, oils, manganous salts, organic substances, phosphates, sulphides, sulphates, tartrates, vegetable astringent infusions and decoctions. Incompatible with the *oxide* are: Antimony and arsenic sulphides, salts of bismuth, copper, iron and mercury; creosote, iodine, organic substances, phosphorus, tannic acid."—(Potter's *Materia Medica,* etc.)

THERAPEUTICS.

1. "Hypodermoclysis is a method of supplying fluid to the body to replace that lost through excessive purging, as in cholera, or in cases of hemorrhage. Further, it may be used to wash from the body various impurities circulating in the blood and lymph, and to flush the kidneys. In other instances it may be used to supply the body with liquid when the stomach will not permit liquid to be swallowed, as in vomiting, or gastric ulcer, or after abdominal operations. It consists in the introduction into the subcutaneous tissue of normal saline solution, which is rapidly absorbed by the vessels.

"When hypodermoclysis is employed after hemorrhage the results are often extraordinary. It is of great value in the collapse of cholera. The cyanosis decreases rapidly, the pulse improves, and respiration is no longer difficult. Some physicians have used hypodermoclysis with very good results in the treatment of uremia, and it is believed that not only are the poisons washed out of the system by this method, but, in addition, that the dilution of the poisons prevents them from acting so severely. In septicemia, diabetic coma, and similar states this method of treatment should be employed and the results carefully recorded. When general dropsy is present it is manifestly useless. Hypodermoclysis has also been used with great advantage in the treatment of severe burns to overcome shock and toxemia. In cases of surgical shock warm saline fluid used by hypodermoclysis is often of great service."—(Hare's *Therapeutics.*)

"The saline solution is conveyed into the cellular tissue through a large hypodermic needle, which should be sterilized by boiling, and is then introduced into the connective tissue, being previously connected by a rubber tube with a reservoir containing warm sterilized salt solution. The usual situations for the introduction of the solution are the external portions of the thighs and the anterior

and lateral portions of the abdominal walls. As much as two or three pints of the solution are often introduced in this manner, with good results."

2. ℞. Ammonii carbonatis, ʒj.
Spiritus chloroformi, ʒj.
Syrupi pruni virginianæ, ʒj.
Misturæ glycyrrhizæ compositæ, q.s. ad ʒviij.
Misce.
Signa: One tablespoonful every three hours.

3. ℞. Acidi hydrochlorici diluti, ʒiij.
Tincturæ nucis vomicæ, ʒiij.
Tincturæ gentianæ compositæ, q.s. ad ʒiij. Misce.
Signa: One teaspoonful in water three times a day, after meals.

4. *Eserine* causes increase of saliva and of perspiration; increased peristalsis; it increases and then diminishes blood pressure and heart action; it causes the pupil to contract; and depresses the nervous system. It is used in flatulence, dilatation of stomach or intestines, tetanus, epilepsy, chorea, respiratory troubles, and as an antidote in strychnine poisoning.

It is used largely in ophthalmic practice. "In a solution of gr. ij to the ounce of water dropped into the eye it is efficient in breaking up or preventing adhesions of the iris, diminishes intraocular tension, prevents suppuration after operations, contracts the pupil, diminishing the entrance of light in photophobia, and empties the vessels of the eye. It is very useful in keratitis, glaucoma, strumous ophthalmia, and neuralgia of the eyeball."—(Potter.)

5. *Therapeutics of zinc salts:* "The sulphate and acetate are used as astringent injections and applications in gonorrhea, leucorrhea, gleet, otitis, conjunctivitis, etc., and the others, in powder or ointment, are employed in a great variety of conditions where a mild astringent effect is desired. The ointment of zinc oxide is perhaps more widely used than any other in the treatment of acute skin diseases. Internally the sulphate is a serviceable emetic in narcotic and other poisoning, and it and the oxide are used in digestive derangements, diarrhea, dysentery, etc. The oxide has been given for the night sweats of phthisis and in various nervous diseases."—(Wilcox's *Materia Medica.*)

Antidote for zinc poisoning: The stomach should be washed out; then milk, white of eggs, or tea, or infusion of bark should be given; then the stomach should be washed out again.

6. The official preparations of oxygen are: Water and solution of hydrogen dioxide.

For *water,* see below, QUESTION 9.

"*Hydrogen dioxide,* in fresh solution, is one of the most powerful oxidizing agents known, by reason of the facility

with which it parts with oxygen to oxidizable substances brought in contact with it. It is consequently a powerful yet non-toxic antiseptic, destroying morbid products and organized ferments to which it is applied. In contact with a suppurating surface it generates a white foam, as the result of its action on the pus. This soon subsides, leaving the subadjacent tissue cleansed of all morbid secretions. One part added to 1000 of water containing sewage or infectious microbes is sufficient to destroy the various organisms if allowed to act thereon for twenty-four hours."—(Potter's *Materia Medica.*)

7. *Ammonium carbonate* is used as a cardiac and gastric stimulant, also as an expectorant, and in the cure of alcoholism.

Ammonium chloride is used as an expectorant, in neuralgias, hepatic disorders, rheumatism, and alcoholism; externally it is used in inflammatory conditions of mucous membranes.

Solution of ammonium acetate is used as a diaphoretic and diuretic in fevers, chronic nephritis, dropsy, and alcoholism.

8. *Stomachics or gastric tonics* "are agents which increase the appetite and promote gastric digestion. They include a number of substances, dietetic and medicinal, some acting by stimulating the production of gastric juice, others by stimulating the local circulation, and several by exciting the activity of the nervomuscular apparatus of the stomach. The first indication is met by the use of dilute alkaline solutions before meals; the second by administering any of the pungent carminatives, as the aromatic oils, pepper, mustard, etc., or by alcohol and ether in small doses, or by the aromatic bitters, as gentian, orange, etc., or the simple bitters, as calumba; while the third desideratum is secured by the use of such agents as nux vomica, hydrastis, arsenic, the dilute mineral acids, and the volatile oils."—(Potter's *Materia Medica.*)

9. *Therapeutics of water:* "Cold baths are employed in the treatment of febrile diseases, more particularly typhoid fever. It is important that frictions should be maintained all the time the patient is in the water. Various modifications of the full cold bath are also employed. Ice-water baths are of great service in sunstroke or thermic fever, and cold water may be injected into the bowel when the skin is cold but the central temperature high. Large injections of cold water are also useful in dysentery. Ice bags are sometimes applied to various parts of the body for the purpose of controlling inflammatory action and also for the hemostatic effect of the cold. Warm baths are employed to soothe pain, alleviate muscular and mental fatigue, promote sleep, and relieve spasmodic conditions

and internal congestion. Hot baths and the hot pack are useful in renal disease and uremia, and in commencing colds, on account of the free diaphoresis they induce. Localized hot baths aid in the same way as general ones, but are less pronounced in their effects. In various painful affections of the eye much relief may be afforded by the application of hot water on cotton pledgets frequently renewed, or by allowing the water to drop continuously on the eye. Internally water is of great service in keeping the urine diluted, and its free use tends to prevent the formation of gallstones, as well as of gravel or urinary calculi. A glass or two of water swallowed upon rising often has the effect of causing an evacuation of the bowels. Tepid water, sometimes with the addition of mustard, is very commonly used as an emetic.—(Wilcox's *Materia Medica.*)

10. ACONITE. *Therapeutics:* For fevers, some inflammatory conditions, in high arterial tension, in nervous palpitation of the heart, and congestive dysmenorrhea; also externally for neuralgia, pruritus, herpes, chilblains, etc. *Physiological action:* First stimulates and then paralyzes heart and also sensory nerves; lowers blood pressure; dilates peripheral blood-vessels, is a respiratory sedative; reduces body temperature; is a diuretic and diaphoretic.

CHEMISTRY.

1. *Reagent* is an agent used in making a chemical reaction.

Valence is the combining power of an atom of an element as compared with that of an atom of hydrogen.

Crystalloid is a substance which when in solution can pass through an animal membrane.

Colloid is a substance which when in solution cannot pass through an animal membrane.

Atom is the smallest part of an element which can enter into chemical action, or that can enter into the composition of a molecule.

2. *Laughing gas* is nitrogen monoxide, N_2O. Its molecule is composed of two atoms of nitrogen and one atom of oxygen. It is obtained by heating ammonium nitrate:

$$(NH_4)NO_3 + \text{heat} = 2H_2O + N_2O.$$

It is a colorless, odorless gas with a sweetish taste, heavier than air, moderately soluble in water and in alcohol; when inhaled it produces exhilaration, loss of consciousness, and anesthesia.

3. *Chemical antidote:* For antimony, tannic acid; for lead acetate, magnesium sulphate; for cocaine, amyl nitrite; for morphine, caffein; for phenol, alcohol.

4. First of all, test for the *albumin,* as follows: The urine must be perfectly clear. If not so, it is to be fil-

tered, and, if this does not render it transparent, it is to be treated with a few drops of magnesia mixture, and again filtered. The reaction is then observed. If it be acid the urine is simply heated to near the boiling point. If the urine be neutral or alkaline it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3.

If albumin is present it should be removed. The urine is then tested for *sugar* and for *bile*, as follows. For *sugar:* Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test tubes. To one test tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.

Test for *bile:* Put 3 c.c. HNO_3 in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquids, which gradually rises, and is succeeded from below by blue, reddish-violet, and yellow.

5. A *metal* is an element which is capable of replacing the hydrogen of an acid to form a salt.

A *non-metal* is an element other than a metal.

An *amalgam* is a substance composed of mercury and some other metal or metals.

An *indicator* is a substance used in chemical analysis to show the completion of a chemical reaction.

6. Nitric acid, HNO_3; boric acid, H_3BO_3; sodium bromide, NaBr; zinc oxide, ZnO; calomel, Hg_2Cl_2.

7. Glycerine is a triatomic alcohol with the formula $C_3H_5(OH)_3$. Its source in nature is from palm oil and other vegetable oils. It is obtained by the saponification of fats by boiling with sodium hydroxide:

$$C_3H_5(C_{18}H_{33}O_2)_3 + 3NaOH = 3NaC_{18}H_{33}O_2 + C_3H_5(OH)_3$$

Glyceryl oleate — Sodium oleate — Glycerin

Glycerin is a colorless, viscid liquid, with a sweet taste; its reaction is neutral, and it mixes readily with water.

8. An *alcohol* is the hydroxide of a hydrocarbon radicle, which reacts with acids to form esters.

An *alkaloid* is a basic, nitrogenous, organic substance of alkaline reaction and capable of uniting with acids to form salts in the same way that ammonia does.

A *salt* is a substance formed by the substitution of a

basylous or electropositive element (or radicle) for part or all of the replaceable hydrogen of an acid.

A *hydrocarbon* is a substance which contains carbon and hydrogen only.

9. *The law of constant proportions:* The same compound always contains the same elements and in the same proportions.

10. $NH_3+HCl=NH_4Cl$

$MgO + H_2SO_4 = MgSO_4 + H_2O$

$2KOH + H_2SO_4 = K_2SO_4 + H_2O$

$NaOH+HCl=NaCl+H_2O$

$Na_3PO_4 + 3AgNO_3 = Ag_3PO_4 + 3NaNO_3$

PATHOLOGY.

1. *Ascaris lumbricoides:* "The male worm is from 5 to 8 inches long and the female from 7 to 15 inches in length. They are from 1/7 to ¼ of an inch in diameter. The body of the worm resembles the ordinary earth worm, but is more grayish than red. The ova are very characteristic, with a rough mamillated exterior. This at times is shelled off and we have a smooth egg which may be mistaken for eggs of other parasites. The eggs leave the body in the feces and after a long time—a few weeks to several months, according to temperature—develop an embryo which remains in the shell until swallowed by some man or animal. It is stated that they will remain alive for years. On being swallowed the embryo leaves the egg and we have males and females developing in the intestine."—(Stitt.)

They may cause (besides round worms) anemia, asphyxia, gangrene of lung, perforation of intestine.

2. Amebic, typhoid, tuberculous, syphilitic, and peptic ulcers.

Amebic ulcer: The ulcers communicate with each other, are covered with thick mucus, have thick hyperemic walls, are found to contain amebæ and other organisms, heal by cicatrization, and often result in stricture.

3. Diseased tonsils may give rise to: Laryngitis, cervical cellulitis, quinsy, suppuration or hypertrophy of tonsils, mouth breathing, adenoids, rheumatism, endocarditis, phlebitis, diphtheria, tuberculosis, or other infection.

4. In *active congestion* there is an increase in the quantity of arterial blood in the part affected, with distention of the capillaries. The condition is one of active hyperemia.

In *passive congestion* there is an increase in the amount of venous blood in the part affected; there is faulty exit of the blood, with retarded flow.

Active congestion is seen in inflammation.

Passive congestion is seen in the swollen finger produced by tying a moderately tight band around it.

5. Residual urine, alkaline urine, cystitis, periurethral inflammation, extravasation of urine into perineum and scrotum, ulceration of bladder, hydronephrosis, pyonephrosis, pyelonephrosis, nephritis.

6. To demonstrate *gonococci:* On a cover-glass make a smear with the discharge as thin as possible, and let it dry in the air; cover it with a freshly made solution of anilin-oil-gentian-violet for one or two minutes; wash it in distilled water; leave it in Gram's solution for two minutes; wash it in 95 per cent. alcohol until decolorized; wash it in distilled water; counterstain with a dilute carbolfuchsin without heat, or with a saturated aqueous solution of Bismark brown; wash in distilled water, dry with filter paper, mount, and examine with an oil-immersion lens. The gonococci will appear as *diplococci within the leucocytes,* which have been *decolorized by Gram's stain,* and have taken the counterstain.

7. The object of vaccine therapy is to produce an active immunity, and to bring about an increased bacterial destruction with the liberation of an increased amount of endotoxin. As a result of inoculation with vaccines there may be found antitoxins, antiendotoxins, lysins, agglutinins, precipitins, opsonins, and other allied products. Wright prepares the typhoid vaccines from 24-hour cultures grown upon the surface of agar, and, after emulsification, standardized to contain 1,000 millions of typhoid bacilli in every cubic centimeter. Sterilization is effected by heating for half an hour at 56° to 58° C., and ½ per cent. lysol is afterwards added. The dose is 500 or 1,000 millions of bacilli.

8. *Repair of fracture:* "The broken ends of the bone are rough and irregular, and the periosteum is torn more or less, but some portion usually remains as a bridge between the fragments. The soft structures in the neighborhood are lacerated, so that the parts are infiltrated with blood clot, which fills up the spaces between the bone ends. As in repair of any other part, the blood clot in a few hours is infiltrated with leucocytes, whose duty it is to absorb the clot. The connective tissue cells in the surrounding parts proliferate, and the bone undergoes rarefying osteitis, so that the place of the blood clot is taken by granulation tissue. The granulation tissue becomes calcified, and the calcified tissue is ultimately replaced by bone. The periosteum plays a large part in the ossification of the new tissue. It becomes stripped up for some distance, hyperemic, and thickened. Granulation tissue is formed from it, and unites with that which has replaced the blood clot. This mass binds the bone together and

forms the *provisional* and *ensheathing callus* which is subsequently ossified by the growth of the periosteal osteoblasts spreading over the mass. The medulla becomes plugged with granulation tissue or *internal callus*, and this, as well as the granulation tissue lying between the fragments of compact bone, becomes ossified, the bone cells of the compact tissue probably proliferating to take part in the repair."—(*Aids to Surgery.*)

9. The exudate consists of fibrin, red corpuscles, polynuclear leucocytes, epithelial cells, and bacteria.

10. "In health the so-called serous cavities of the body contain very little fluid. In pathological conditions large accumulations of fluid may be observed, not only in the serous cavities, but also in the areolar connective tissue, beneath the skin, and beneath the muscles. When due to circulatory disturbances or a hydremic condition of the blood such accumulations of fluid are spoken of as *transudates;* while the term *exudates* is applied to similar accumulations of inflammatory origin. Clinically it is frequently difficult to distinguish between transudates and exudates.

"*Transudates* are usually serous in character, when they present a light straw color; at times, however, owing to admixture of blood, they have a reddish tinge, and are then said to be hemorrhagic; in rare instances they are colorless.

"*Exudates* may be serous, serofibrinous, hemorrhagic, seropurulent, purulent, putrid, chylous, or chyloid. Of these the seropurulent, purulent, and putrid types are manifestly of inflammatory origin; while in the case of the serous, serofibrinous, and hemorrhagic forms it may at times be difficult to determine whether the fluid represents a transudate or whether it is an exudate."—(From Simon's *Clinical Diagnosis.*)

PRACTICE.

1. *Von Graefe's sign:* The upper eyelid does not follow promptly the downward movement of the eyeball; found in exophthalmic goiter.

Uremia: A form of autointoxication occurring in some cases of nephritis and in anuria.

Arteriosclerosis: A thickening and hardening of an artery due to a fibrous overgrowth of the intima and degenerative changes in the middle coat of the artery; the artery loses its elasticity and contractility.

Cirrhosis of the liver: A condition in which the parenchymatous cells of the liver are atrophied or degenerated, while the interstitial connective tissue is hypertrophied.

Angina pectoris: A severe constricting pain in the thorax radiating from the heart down the left arm, some-

times into the back, and accompanied by a severe cardiac oppression and a fear of impending death.

2. *Dysphagia:* Difficulty in swallowing.

Hematuria: Passage of blood in the urine.

Hemoptysis: Hemorrhage from the lungs or bronchial tubes.

Laryngysmus stridulus: A spasmodic closure of the glottis, lasting a few seconds and followed by a noisy inspiration.

Pertussis: Whooping cough; an acute infectious disease characterized by recurrent and spasmodic attacks of coughing followed by a deep and noisy inspiration.

3. *Diseases most commonly occurring in the right inguinal region:* Appendicitis, inguinal hernia, fibroid tumors, hematoma, pyosalpinx, ovarian cyst or abscess, psoas abscess, foreign bodies, floating kidney, and cancer of cecum.

4. *Neuritis* gives pain which is made worse by pressure; pain is not relieved by rest; hyperthesia, trophic changes, glossy skin, and no fever.

Rheumatism gives pain on movement, no trophic changes, rest relieves the pain, and there may be fever.

5. In *diphtheria* the onset is more gradual; the temperature rises to about 102° to 103° F.; the tonsils are not much enlarged; there is an exudate of a thick, grayish membrane which is very adherent, is removed only with difficulty, and leaves a bleeding surface; this membrane soon re-forms and may be found on the fauces and pharynx as well as on the tonsils; in the exudate the Klebs-Loeffler bacilli may be found. In *follicular tonsillitis* the onset is more sudden; the temperature may be a little higher than that of diphtheria; there is no membrane, but the tonsils are red and swollen, and in the crypts are seen white, cheesy spots or plugs, which consist of broken-down epithelium and are easily brushed away; Klebs-Loeffler bacilli are never found.

6. *Scarlatina:* Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours. Character of eruption, a scarlet punctuate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker; the tongue is of the "strawberry" type; the lymphatics in the neck may be swollen, and there is sore throat; Koplik's spots are absent. *Rubeola:* Period of incubation ten to twelve days. Stage of invasion, four days. Character of eruption, small, dark red papules with crescentic borders, beginning on face and rapidly spreading over the entire body; desquamation is branny. The eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower,

the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present. *Rubella:* Period of incubation ten to seventeen days. Stage of invasion, one day. Eruption appears on first day, is most intense on second day, consists of red papules, often fades from face before it is seen on the limbs. The pulse is not much accelerated, all the symptoms are slight. Desquamation is very slight. There may be slight sore throat and swollen cervical glands. Koplik's spots are absent.

7. *In renal colic:* The pain is in the region of the affected kidney, it radiates down the thigh; there are intense rigors; retraction of the testicle may be present; also history of previous attacks or of calculi; the urine may be scanty, suppressed, or bloody.

In intestinal colic: The pain is generally around the umbilicus; the abdomen is tympanitic; there are no rigors; there may be a history of indiscretion in diet.

In uterine colic: The pain is in the pelvis, and is associated with menstrual disorders; in fact, it is a dysmenorrhea.

8. *Treatment of angina pectoris:* Inhalation of five minims of nitrite of amyl during the attack; inhalation of chloroform may be necessary. Stimulants, strychnine, and attention to the underlying cardiac and arterial conditions are indicated.

9. *Treatment of lobar pneumonia:* Consists in rest in bed, milk diet, and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice bags or compresses wrung out of cold water (60° to 70° F.) to the chest or by the use of the warm or cold wet pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60 to 1/20), atropine, caffein, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high tension pulse, bleeding may be beneficial in the first forty-eight hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease.—(*Pocket Cyclopedia.*)

10. *Treatment of acute dysentery* consists of rest in bed and liquid diet. Laudanum, gtt. 30, followed in half hour by ipecac, gr. 30, repeated, if necessary, has been recommended for internal administration. Rectal irrigations of plain water, silver nitrate solution (gr. 20-30 to the quart), creolin (3ss to the quart), or quinine (1:5000 to 1:1000) constitute the best treatment. Pain is relieved by opium.

OBSTETRICS.

1. Sagittal, frontal, coronal, and lambdoidal sutures.

2. The utmost care should be taken that the patient, physician, nurse, and any other attendants maintain the greatest care with regard to cleanliness and asepsis. Nothing should come in contact with the genitals of the patient that is not sterile. Examinations should be as few as possible.

3. *Indications for the use of forceps are:* (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior; (*b*) mentoanterior face; (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute. (4) *Accidental complications:* Hemorrhage; prolapsed funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both. *Contraindications:* Mechanical obstruction in the parturient canal; incomplete dilatation of the os; non-rupture of membranes; non-engagement of the presenting part; the fetal head being too large or too small; distended bladder or rectum.

Before applying the instruments they should be sterilized, preferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the vulva; the tip is introduced into the vagina, passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades must be rotated forward. If the head occupies the right oblique diameter, as in L. O. A. and R. O. P. positions, the right blade must be rotated; if it occupies the left oblique diameter, the left blade must be rotated. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps. In posterior positions it is necessary to remove the instruments after the head is drawn down to the pelvic floor; after anterior rotation is secured they may be reapplied. If the occiput rotates into the hollow of the sacrum the hands should be depressed as the

face is swept out under the symphysis pubis.—(*Pocket Cyclopedia.*)

4. *The use of ergot:* "The routine administration of ergot after the birth of the child is not to be recommended. No remedy should be administered in any condition unless there is a direct indication for its use. In primipara and strong multipara the uterine contraction should be strong enough to effectually empty the cavity of the womb and obliterate the venous channels. In such cases the ergot is useless or even dangerous in that it may cause an irregular hour-glass contraction of the uterus, with retention of clots, membranes, and débris, and at the same time has a retarding influence upon the development of the milk. Then again, if given before the birth of the child, serious or even fatal asphyxia may result from the tetanic contractions induced by the drug. The danger of laceration of the cervix, perineum, and vaginal wall as well as of rupture of the uterus is increased by the use of ergot. There is, however, a suitable class of cases in which the use of ergot is indicated in appropriate doses. This includes all forms of uterine exhaustion and inertia during the late second and third stage and after delivery has been completed."—(Dorland's *Obstetrics.*)

5. The outspread hand of the physician is applied to the distended perineum, and the head of the fetus is kept flexed as much as possible; the perineum is thus supported and delivery is not allowed till the parts are well dilated.

6. Placenta prævia central, marginal, and lateral.

7. The navel should be covered with a dusting powder (salicylic acid one part in starch 5 parts), then covered with dry, sterile gauze; and must be kept dry. It should not be touched unless for good cause.

8. Substitutes for mother's milk or milk of wet nurse; goat's milk or cow's milk modified in various ways to suit the needs of the child.

9. *Forms of endometritis:* Acute and chronic; congestive, gonorrheal, tubercular, septic, senile, decidual. (There is no recognized classification.)

10. *Forms of vaginitis:* Superficial, simple, granular, senile, emphysematous, bacterial (such as gonorrheal diphtheritic, tuberculous, syphilitic, chancroidal). (There is no recognized classification.) *Treatment* consists in rest, cleanliness, douches, the application of soothing lotions, and removal of any cause; salines and anodynes are also indicated.

SURGERY.

1. *Fissured fractures of the vault* are due to direct injuries, such as blows, or to indirect injury, such as com-

pression, which bursts the skull. If simple there are no definite signs; if compound the fissure can be seen and felt. The prevention of sepsis forms the main line of treatment. Callus may form at the site of fracture and produce traumatic epilepsy.

Depressed and punctured fractures are due to direct violence; usually affect the vault; may be simple, compound, or comminuted. The outer table may be depressed without the inner being broken, in such places as the frontal sinus. Rarely the inner table is broken and depressed without fracture of the outer. As a rule both tables are broken. The inner suffers most damage, as it is less supported; the force of the blow is more diffused by the time it reaches the inner; also, the momentum of the striking body is less, and the débris of the outer table increases the size of the penetrating body.

Symptoms: If there is a wound, the fracture and depression may be seen and blood, cerebrospinal fluid, or brain, may be escaping. If there is no wound a careful examination is necessary, as a hematoma may form and obscure the depression. In cases of doubt an incision should be made.

In a *simple depressed fracture* there is usually some concussion, which is followed by compression from hemorrhage in the neighborhood. The depressed bone also causes compression later by the *spreading edema* it sets up in the brain. Death may result quickly, or the patient may recover and then become the subject of traumatic epilepsy from irritation of the cortex. If the depression is over the motor area convulsions or paralysis are quickly induced.

In a *compound depressed fracture* the blood escapes and does not produce compression. Concussion may or may not be present. The advent of sepsis produces inflammation of the bone, membranes, and brain, which may be limited if the drainage is free; but if not death soon follows from compression by the inflammatory exudation. During the stage of compression a hernia cerebri is formed. If the depressed fragments are early removed and asepsis is maintained the patient has a good chance, unless the brain itself is severely injured.

Treatment.—In all cases, except the saucer-like depressions which occur in young infants, it is necessary to elevate or remove the depressed fragments, stop all bleeding, and disinfect the wound. Symptoms should never be waited for, because, although the patient may recover without operation, the depressed bone may cause traumatic epilepsy or insanity. The skin is shaved and purified, and a large flap is turned down to expose the fractured area, or if a wound is present it is enlarged. Comminuted fragments are removed, and sharp edges which press on

the dura mater are clipped away with Hoffmann's forceps. If an elevator cannot be introduced under the depressed bone a trephine hole is made through the nearest sound bone, the elevator introduced, and the bone prised up. The piece of bone removed with the trephine should be replaced. If the dura matter is torn it should be stitched up and then the scalp flap is sutured without a drain, unless oozing is still going on. If the fracture has been compound it is better to drain it for twenty-four hours. In punctured fractures the hole must be enlarged by trephining, so as to remove the depressed spicules. After operation the patient must be kept quiet in a darkened room on liquid diet for a few days.—(*Aids to Surgery.*)

2. FRACTURES. *Varieties:* Simple, compound, greenstick, complete, incomplete, transverse, oblique, spiral, comminuted, impacted, complicated. *Etiology:* Violence, muscular action; and general morbid conditions and diseases, with age, sex, and occupation as predisposing factors. *Symptoms:* History of injury, disability, wound or contusion, unnatural mobility, crepitus, pain, deformity. *Complications:* Communication, involvement of a joint, dislocation, injury to artery or vein or nerve or viscus.

3. DISLOCATIONS. *Varieties:* Congenital and traumatic. *Etiology* of congenital, malposition in utero, disease of or injury to fetus; of traumatic, violence, muscular action, lax muscles and ligaments, and shallow articular cavity. *Incomplete* dislocations have the articular surfaces only partly separated. *Complete* dislocations have these surfaces completely separated. *Compound* dislocations have an external wound communicating with the joint. *Complicated dislocations* have also some injury to bone, artery, vein, or nerve.

4. *Operative Treatment of Simple Fractures:* "In certain cases it is found impossible to bring the fragments into accurate apposition or to retain them there. This may be due to the obliquity of the fracture, as, for example, in the bones of the leg; to the interlocking of fragments, as occurs frequently in epiphysial separations; to the traction of powerful muscles on one of the fragments, as in fracture of the patella or olecranon; or to the interposition of soft tissues between the broken ends. Under such circumstances it may be necessary to expose the fracture by operation, and after reducing it to fix the fragments together by wires, pegs, staples, or screws. Operative interference is usually delayed till about a week after the injury, by which time the effect of other measures will have been estimated, and accurate information obtained by means of the *x*-rays regarding the nature of the lesion and the position of the fragments. Such operations, however, are not to be undertaken lightly, as they are difficult,

and if septic infection takes place the results may be disastrous. Arbuthnot Lane advocates a more general resort to operative measures, even in simple and uncomplicated fractures."—(Thomson and Miles' *Surgery.*)

5. Rapid pulse, with palpitation; slight thyroid enlargement, and prominence of the eyeballs.

6. Obstruction of common duct gives jaundice; obstruction of cystic duct does not.

7. *Glaucoma* is a diseased condition of the eye, produced by increased intraocular pressure, and resulting in excavation and atrophy of the optic disc, and blindness. It is due to increase of the contents of the eye, hypersecretion, retention, old age, gout, rheumatism, nephritis. *Symptoms:* Visual disturbances, increased ocular tension, hazy and anesthetic cornea, sluggish and dilated pupil, shallow anterior chamber, ciliary neuralgia, cupping of optic disc, blindness. *Treatment:* Myotics, such as eserine or pilocarpine; massage of the eyeball; mydriatics are contraindicated; operative treatment may include paracentesis, iridectomy, or sclerotomy.

8. *Hematoma:* A blood tumor, or circumscribed hemorrhage with the blood lying in a distinct cavity in the tissues.

Aneurysm: A pulsating sac containing blood and communicating with the lumen of an artery.

Thrombus: A blood clot formed in the heart or a blood-vessel during life, and remaining at its point of formation.

Embolus: A similar clot, but brought from a distance and plugging up a blood-vessel.

9. *Salvarsan is indicated* in: "(*a*) Early cases of syphilis in which contagious manifestations are appearing in rapid succession, in spite of efficient mercurial medication. (*b*) Cases in which, for family or social reasons, it is of special importance to limit the production of infective material or cause the disappearance of symptoms in the shortest possible time. (*c*) Cases in which the symptoms are recalcitrant to the action of mercury, or in which, from idiosyncrasy, that drug cannot be exhibited in sufficient dose. (*d*) Cases of syphilophobia and syphilomania, whether showing symptoms or not; its psychic action in these instances being of greater importance than its therapeutic effect. (*e*) Very early cases of the sequelæ of the luetic infection, before organic changes have occurred."

Salvarsan is contraindicated in: "(*a*) Cases that are doing well, *i.e.* in which the disease is pursuing its normal mild course under ordinary medication. (*b*) Cases with serious organic lesions of the eyes, kidneys, heart, or other internal organs. (*c*) Cases with postsyphilitic or parasyphilitic disease of the internal organs, more especially of the nervous system."—(*Progressive Medicine.*)

It may be administered intramuscularly or intravenously. The intravenous injection is described by Hirsch as follows: Two graduated glass containers of 250 c.c. capacity are used. Into one is poured 150 to 200 c.c. of sterile salvarsan solution. The other is filled with a like volume of sterile saline solution (made with sterile distilled water and chemically pure sodium chloride). The saline solution is allowed to flow out of the needle so as to expel all air from the tube. The stopcock is now reversed, allowing the salvarsan solution to flow out of the needle, thereby expelling all air from its tubing. The stopcock is now reversed to its former position, until the saline solution is running in a slow, even stream from the needle. The desired site of puncture is selected on the arm or at the elbow, and the needle is gently pushed or thrust through the skin into the vein. Meanwhile the saline solution is continuously running from it. The needle is held at about an angle of 10 to 15 degrees to the skin surface, depending on the prominence and caliber of the vein. Care must be exercised not to push the needle through both walls of the vein. This can be avoided by not introducing too long a surface of the needle into the tissues.

The patient's arm having been carefully cleansed, a ligature in the form of an ordinary soft rubber catheter or tubing is tied around the middle of the arm, above the selected site of puncture, and the patient is requested to tighten the fist so as to make the superficial veins more prominent. Some prefer to expose the vein in all cases.

10. Otalgia is earache. *Earache* may be due to a wide variety of causes—in the meatus, cerumen, furuncle, or dermatitis; in the middle ear, acute catarrh, or suppuration, acute or chronic. It may be referred from a carious tooth, or from disease of the tongue, or may be due to Eustachian obstruction secondary to pharyngitis and frequently to adenoids. For a satisfactory treatment a correct diagnosis is essential; and, if possible, the cause must be removed.

To relieve the pain: Apply dry heat; or drop into the external meatus a few minims of equal parts of tincture of aconite and tincture of opium; or similarly apply ten drops of a 2 per cent. solution of phenol; or spray over the tympanic membrane a 4 per cent. solution of cocaine, and force a little of the same into the Eustachian tubes by letting the patient inhale the spray, and then expanding the tubes by Valsalva's method; this repeated every three minutes is said to be a sure method of cure.

STATE BOARD EXAMINATION QUESTIONS.

MASSACHUSETTS BOARD OF REGISTRATION IN MEDICINE.

ANATOMY AND HISTOLOGY.

1. Describe the arrangement of the dura mater and state functions.
2. Make a diagram of the stomach, moderately distended, and state its anatomical relations.
3. Describe the portal circulation and state how it is connected with the systemic.
4. What is Poupart's ligament? State origin and insertion, and the structures which pass under it.
5. Describe a muscle fiber. Name three parts of the body in which unstriped muscle is found.
6. State origins of vertebral, internal mammary, and basilar arteries.
7. Name the largest cranial nerve. How many roots has it, and what is its superficial origin? Why is it called a compound nerve?
8. Make a diagram of the second nerve. What is its exclusive distribution?
9. Locate and give the gross anatomy of the medulla oblongata.
10. Oral examination.

PHYSIOLOGY AND HYGIENE.

1. State the functions of the fifth nerve.
2. Trace the nervous path in case of reflex action. Is walking a reflex?
3. What is the purpose of the Haversian canals? What is the function of the marrow and the periosteum?
4. Name and locate the valves of the heart and state their functions. What is the velocity of the blood current?
5. When food of various types is digested, where and in what way does it enter the blood stream?
6. Describe the phenomena which occur when muscle is in a state of activity.
7. What objections may be given to heating dwelling rooms by direct radiation from stoves and from steam or hot water pipes? What would you recommend as a substitute?
8. What conditions tend to prolong the life of a bacillus outside of the body?
9. Mention diseases where germs are carried by water; also by air.
10. Oral examination.

PATHOLOGY AND BACTERIOLOGY.

1. Differentiate death by drowning and death by strangulation.

2. Name and describe five abnormal constituents of urine which signify disease. How are they determined?
3. State pathological conditions for relief of which diuretics are generally administered.
4. Describe a tubercle. What is its origin and what tissues are most frequently invaded by it?
5. Give the pathology of the initial, the secondary, and the tertiary stages of syphilis.
6. Why does metastasis in carcinoma occur through the lymphatic system and sarcoma through the venous system?
7. What classification is made of bacteria based on the shape of the individuals?
8. What classification of the cocci, based on the arrangement of the individuals composing the groups, can you mention?
9. What bacterium is associated generally with specific urethritis? How may it be determined?
10. State the pathology of hydrocele.

DIAGNOSIS AND THERAPEUTICS.

1. What is glaucoma? Discuss symptoms and treatment.
2. Define and differentiate hallucinations, delusions, and illusions.
3. Describe paralysis agitans. Give etiology and prognosis.
4. Describe characteristic findings in the urine in a case of acute nephritis.
5. Give the symptoms indicating intestinal perforation in typhoid fever. What treatment may avail?
6. Outline the treatment of a case of diphtheria by the use of antitoxin. What is the principle upon which the antitoxin treatment is based?
7. How should an abscess of the middle ear be treated? What serious complications may arise from such an abscess?
8. What are the indications and contraindications as to the use of digitalis as a cardiac stimulant?
9. Differentiate diabetes mellitus and diabetes insipidus. What treatment does the latter demand?
10. What is the significance of the patellar reflex as indicative of disease?

PEDIATRICS AND TOXICOLOGY.

1. Symptoms and treatment of tuberculosis of the nose; also of the eye and of the ear.
2. Describe tuberculosis of the lymphatic glands and outline treatment.
3. State the nature, symptoms, course, and treatment of Pott's disease.

4. Describe scabies. How would you treat a well developed case?

5. Describe and differentiate pemphigus and varicella.

6. Describe catarrh of the middle ear; etiology, symptoms, course, and treatment.

7. Arriving within five minutes after your patient has swallowed a 2-ounce solution containing 5 to 8 grains of cocaine hydrochlorate, in what condition would you expect to find him, and what would you do for him?

8. Arriving an hour after your patient had taken cocaine as mentioned in question 7, in what condition would you expect to find him, and what would you do for him?

9. State in detail what you would consider the most efficient treatment, when promptly administered, for a patient who has swallowed a dangerous dose of carbolic acid? Should the treatment be delayed for half an hour to an hour after ingestion of the dose, what would be your treatment?

10. In what manner does death ensue in poisoning by hydrocyanic acid, by aconite, by morphine, by atropine, by strychnine?

SURGERY.

1. Give etiology, symptoms, and treatment of empyema. State usual results when not treated.

2. Differentiate chancre and chancroid, and state treatment for each.

3. State the symptoms of fracture of both bones of the forearm in their middle third. How would you treat a case?

4. State the causes of nonunion in bone fractures. What should be the treatment in such cases?

5. Differentiate piles, fistula, and fissure. Treat the last.

6. Discuss ascites—causes, differential diagnosis, and treatment.

7. Give the symptoms of renal calculus. State cause and treatment during an attack, and also treatment in the interval between attacks.

8. State the diagnostic points in prostatic hypertrophy. Give palliative treatment.

9. Define psoas abscess. What is the nature of its fluid? What can you say as to its treatment?

10. Oral examination.

OBSTETRICS AND GYNECOLOGY.

1. Discuss the conditions which may render anesthesia advisable during labor. What anesthetic would you use, and how would you administer it?

2. Define second stage of labor and state the conditions

which may cause delay of delivery in this stage, and how such conditions should be managed.

3. Describe toxemia as noted in pregnancy, and state measures of prevention and of alleviation.

4. Define endometritis and state cause, symptoms, and treatment.

5. Should the head of the child fail to enter the pelvic brim, how would you conduct your case of labor?

6. Mention not less than four conditions liable to cause prolapse of the cord, and outline the treatment for any one condition mentioned.

7. Differentiate the uterus of a virgin and that of a multipara, as observed in post-mortem examination.

8. Discuss possible injuries to the birth-canal incident to labor. How and when are they best discovered, and state how they should be treated.

9. How can you differentiate uterine and vaginal leucorrhea?

10. Discuss gonorrhea in women—symptoms and far-reaching results.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Massachusetts Board of Registration in Medicine.

ANATOMY AND HISTOLOGY.

1. *Arrangement of dura:* It is arranged in three processes: (1) The *falx cerebri:* placed vertically between the two hemispheres of the cerebrum, attached in front to the crista galli, behind to the upper surface of the tentorium, and between these above to middle line of internal surface of skull, while the lower border is concave and free. In relation with it are the superior and inferior longitudinal, and the straight sinuses.

(2) The *tentorium cerebelli* is a crescentic fold of dura mater placed between the cerebrum and the cerebellum. The tentorium is a tent-like process, highest above and in front, at its most anterior point of attachment of the falx cerebri by which the tentorium is suspended, and from this point descending on all sides. In relation to it are the lateral, superior petrosal, and straight sinuses.

(3) The *falx cerebelli* reaches vertically from the tentorium to the foramen magnum, dividing the two hemispheres of the cerebellum. It is attached posteriorly to the vertical crest of the occiput, where it encloses the occipital sinus, and below to each side of the foramen magnum.—(*Aids to Anatomy.*)

The *function of the dura* is protection: It forms the internal periosteum of the skull, it forms three parti-

tions for the support of the parts of the brain, it forms sinuses or venous channels for the return of the blood from the brain, and it forms sheaths for the nerves as they leave the skull.

2. *Anatomical relations of the stomach:*

Left or *cardiac end:* Fixed by esophagus and gastrophrenic ligament to diaphragm, lying beneath the seventh left costal cartilage, one inch from sternum; it is connected with the spleen by the gastrosplenic omentum.

Right or *pyloric end:* Reaches gall-bladder, touching under part of quadrate lobe of liver; is very movable, when stomach is empty is in midline four inches below tip of gladiolus.

Anterior surface, which also looks upward, is in contact with, from left to right, diaphragm, abdominal parietes (epigastric region), under surface of liver.

Posterior surface is separated from pancreas, crura of diaphragm, aorta, vena cava inferior and solar plexus, by lesser sac of peritoneum.

Superior border: Attached to liver by small omentum.

Inferior border: Gives attachment to great omentum.

(*Aids to Anatomy.*)

3. *Portal circulation:* "The hepatic artery and the portal vein convey blood to the liver. The artery carries arterial blood, and the vein food-laden venous blood from the walls of the alimentary canal, and from the spleen and pancreas. Both vessels enter the liver at the transverse fissure, and they ramify in its interior, breaking up into small terminal branches which run between the lobules and send fine capillary branches into their substance; from these latter branches the blood passes into the capillary tributaries of the intralobular veins, thence to the sublobular veins, and from the sublobular veins to the hepatic veins, which terminate on the posterior surface of the liver in the inferior vena cava."—(Bain's *Medical Practice.*)

The portal circulation is connected with the systemic: (1) By the hemorrhoidal veins of the inferior mesenteric anastomosing with the hemorrhoidal veins of the internal iliac; (2) by the anastomosis of the gastric and esophageal veins; (3) by the anastomosis between the left renal vein and the intestinal veins.

4. Poupart's ligament is formed by the lower border of the aponeurosis of the external oblique muscle; it extends from the anterior superior spine of the ilium to the spine of the pubes. The anatomical structures which lie beneath Poupart's ligament are (from without inward): External cutaneous nerve, Iliacus, anterior crural nerve, Psoas, femoral artery, femoral vein, femoral ring.

5. In *nonstriated muscle* "the individual fibers are short, narrow, and spindle-shaped. Each is usually 25 to 200

microns in length, and 5 to 70 microns in breadth. No sarcolemma is present, and striations are absent. In each fiber there is but one nucleus, which is long, slender, darkly staining, and centrally located. This is not seen in all cross sections, but when present shows as a small, dark dot. These fibers vary in length from 25 to 200 microns, ordinarily; in diameter they average about 5 microns. The fibers are arranged in bundles, but instead of forming masses like muscles the bundles are arranged into layers, which extend circularly and longitudinally in the hollow viscera. Capillaries exist between the fibers. The *nerves* are chiefly of the *sympathetic* variety. *Distribution:* Involuntary muscles are found in the alimentary tract from the middle third of the esophagus to the anus, in the ducts of glands, in the trachea and bronchial tubes, the internal urinary and genital systems, circulatory (except the heart) and lymphatic systems, and the capsules of some organs."—(From Radasch's *Compend.*)

6. Vertebral artery is from subclavian artery; internal mammary artery is from subclavian artery; basilar artery is from two vertebral arteries.

7. The largest cranial nerve is the fifth, or trigeminal. It has two roots. Its superficial origin is from the side of the pons Varolii, nearer to the upper than the lower border. It is called a compound nerve because it contains both motor and sensory fibers.

8. *Second, or optic nerve: Origin,* from optic tract, which arises by two roots: *Outer,* from external geniculate body, optic thalamus and brachium of superior quadrigeminal body. *Inner,* from internal geniculate body. *Course:* Winds across outer and anterior surfaces of crus cerebri, uniting with fellow to form optic commissure, which is bounded in front by the lamina cinerea and behind by the tuber cinereum; the nerves separate at fore part of commissure, get ensheathed in arachnoid, and pass into orbit through optic foramen above and internal to ophthalmic artery; while passing through, each receives a tube of dura mater, which divides into two, the outer piece becoming orbital periosteum, and the inner, ensheathing the nerve, joins the sclerotic in front. The nerve pierces sclerotic and choroid coats of eyeball. *Distribution:* Expands to form retina. *Special function:* Nerve of sight.—(*Aids to Anatomy.*)

9. The *medulla oblongata* is the lowest part of the encephalon, and is continuous below with the spinal cord. It extends from the lower margin of the pons to the lower margin of the foramen magnum. It lies in the basilar groove of the occipital bone; its dorsal surface is between the cerebellar hemispheres. It forms the lower part of the floor of the fourth ventricle. It is about one inch long,

half inch wide, and half inch thick. It has anterior and posterior median fissures, which are continuous with those of the spinal cord.

PHYSIOLOGY AND HYGIENE.

1. THE FUNCTIONS OF THE FIFTH CRANIAL NERVE. *First ophthalmic branch* supplies sensation to conjunctiva and skin of upper eyelid, cornea, skin of forehead and nose, lacrymal glands, mucous membrane of nose. *Second, or superior maxillary branch,* supplies sensation to skin and conjunctiva of lower lid, nose, cheek, upper lip, upper teeth and alveolar processes, and palate. *Third, or inferior maxillary branch,* supplies sensation to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower teeth, lower lip, and skin of the lower part of the face. This branch, in addition, supplies motion to the muscles of mastication (Masseter, Temporal, External, Pterygoid, Internal Pterygoid), also mylohyoid, and anterior belly of digastric.

2. *Reflex actions* are involuntary or unconscious movements, due to suitable stimuli. They depend upon the integrity of the *reflex arc,* which is a complex made up of: (1) A surface capable of receiving an impression; (2) an afferent nerve; (3) a nerve cell capable of receiving and also of sending out impulses; (4) an efferent nerve, and (5) a surface capable of responding in some way to the impulse conveyed by the efferent nerve. Reflexes are classified as: (1) Superficial, (2) deep, and (3) visceral. *Example:* The patellar reflex consists of a contraction of the extensor muscles of the leg and a movement of the foot forward when the ligamentum patellæ is struck; the quadriceps extensor must first be slightly stretched by putting one knee over the other. Its integrity depends upon a healthy condition of the entire reflex arc, consisting of tendons, afferent or sensory nerve, pulsterior roots, and anterior horn of the spinal cord; the efferent or motor nerve, and the muscle itself. Strictly speaking, *walking* is primarily a voluntary act; but practically it may be considered as a reflex.

3. *The Haversian canals* serve to conduct arteries, veins, lymphatics, and nerves to and from the bone substance. The *marrow* supports the blood-vessels, is concerned in the formation of bone, also nourishes spongy bone, and forms red blood corpuscles. The *periosteum* acts as a protection to the bone; also generates bone, aids in the repair of bone, and takes part in the nourishment of bone.

4. *The valves of the heart* are: In the *right auricle,* the Eustachian and coronary valves; the former is situated between the anterior margin of the inferior vena cava and the auriculoventricular orifice. In the fetus it directs

the blood from the inferior vena cava through the foraman ovale into the left auricle; the coronary valve prevents the regurgitation of the blood into the coronary sinus during the auricular contraction. In the *right ventricle* are the tricuspid and semi-lunar valves; the former prevents the blood in the right ventricle from flowing back into the right auricle during ventricular cystole; the latter guards the orifice of the pulmonary artery. In the *left ventricle* are the mitral and semi-lunar valves; the former acts similarly to the tricuspid; the latter guards the orifice of the aorta. Aortic valves, behind the third intercostal space, close to the left side of the sternum. Pulmonary valves, in front of the aortic, behind the junction of the third rib, on the left side, with the sternum. Tricuspid valves, behind the middle of the sternum, about the level of the fourth costal cartilage. Mitral valves, behind the third intercostal space, about one inch to the left of the sternum. *The velocity of the blood current* is about one foot per second in the arteries; about one inch per minute in the capillaries; and about eight inches a second in the veins. The complete circulation around the body is said to occupy a little less than half a minute.

5. The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unites to form the portal vein, and (2) by the lymph vessels of the small intestines, which converge to empty into the thoracic duct. The water, inorganic salts, proteids, and sugar go by way of the portal vein to the ascending vena cava; and the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

6. *When a muscle is in a state of activity:* (1) It becomes shorter and thicker, but (2) there is no change in volume; (3) there is an increased consumption of oxygen; (4) more carbon dioxide is set free; (5) sarcolactic acid is produced; and hence (6) the muscle becomes acid in reaction; (7) it becomes more extensible, and (8) less elastic; (9) there is an increase in heat production and consequently a rise of temperature; (10) the electrical reaction becomes relatively negative; and (11) a sound is produced.

7. The objection to *stoves* is that the air gets dry and unpleasant, the air is thus often hotter than the walls and floor, and so chills are produced; the presence of carbon dioxide is often noted. *Steam or hot-water pipes* are about as good a method of heating a house as any known.

8. *Conditions that tend to prolong the life of a bacillus outside of the body:* Moisture, rest, moderate warmth, dim light, alkaline medium, and suitable nourishment.

9. Diseases whose germs are carried *by water:* Typhoid,

cholera, dysentery, sometimes diphtheria; germs are carried *by air:* Tuberculosis, scarlet fever, measles, smallpox, pneumonia, influenza, diphtheria, and erysipelas.

PATHOLOGY AND BACTERIOLOGY.

1. *In death by drowning:* The surface is pallid, the face appears tranquil, the eyes and mouth being partly open. The skin often has the appearance known as gooseskin, and, if the body has lain upwards of twelve hours in the water, that of the hands and the feet is sodden by imbibition. The most important external sign is the presence on the mouth and nostrils of a fine froth (possibly blood stained), composed of air, mucus, and the medium in which drowning took place; if the body remains three or four days in water, the froth disappears. Exceptionally, fragments of weeds or other small objects may be found tightly grasped in the hands. On opening the thorax the lungs, gray in color, with reddish staining, are seen to be very voluminous, a condition known as ballooning, partly due to infiltration of the lung tissue with some of the medium in which drowning took place, and partly to true edema. The lung substance is inelastic and pits on pressure. On section, fluid and froth resembling that found on the lips exude from the divided air passages. Minute subpleural hemorrhages are not infrequently present, and the pleural cavities may contain fluid. The stomach often contains water or other liquid which was involuntarily swallowed during attempts at respiration. Occasionally some of this fluid is forced by vital action into the intestines. With one exception, the remaining appearances are those met with after death from asphyxia. The exception is constituted by the blood, which is not only dark colored and fluid, as is usual after death from asphyxia, but is also diluted by the imbibition of water from the stomach and lungs.

In death by strangulation: The blood is of a dark color, owing to complete reduction of the hemoglobin. The proportion of carbonic acid is increased, and owing to its excess the blood coagulates slowly or imperfectly; hence it remains fluid or forms few and soft coagula. The large veins, the pulmonary artery, and the cavities of the right side of the heart may be distended with dark fluid blood, but this is by no means necessarily the case. The left side is usually empty or nearly so. The lungs may be congested, but are often pallid and anemic, though the dependent parts usually exhibit appearances of hypostatic engorgement. The abdominal viscera, especially the kidneys, are often congested. The appearance of the brain varies; it may be anemic or more or less congested. Special signs characterize special modes of causation of as-

phyxia. Very commonly punctate ecchymoses are visible on the conjunctiva, face, neck, and chest. They are considered by Tardieu to be more frequent in strangulation than in asphyxia from other causes, or than in cases of overstraining, which likewise may lead to them. In the subcutaneous cellular tissue, and in the fascia of the muscles above and below the hyoid bone extravasations are frequently found, as well as on the external surface of the thyroid cartilage and trachea. The lungs vary as regards their vascularity; but on the surface it is common to find pseudomembranous patches, which are due to the rupture of some of the superficial air cells and collection of air bubbles under the pleura. In the substance of the lungs congested patches, or apoplectic extravasations, are often found, varying in size, but larger than those usually found in suffocation.—(From Quain's *Dictionary of Medicine.*)

2. Five abnormal constituents: Albumin, sugar, blood, bile pigment, and excess of indican.

Test for *albumin:* The urine must be perfectly clear. If not so, it is to be filtered, and, if this does not render it transparent, it is to be treated with a few drops of magnesia mixture and again filtered. The reaction is then observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present, a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3.

Test for *sugar:* Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test tubes. To one test tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.

Test for *blood:* To the urine add a solution of potassium hydroxide to distinct alkaline reaction; heat nearly to boiling (do not boil). A red precipitate is produced.

Test for *bile pigment:* Put 3 c.c. HNO_3 in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquid, which gradually rises, and is succeeded from below by blue, reddish-violet, and yellow.

Test for *indican:* The urine is mixed with one-fifth its volume of 20 per cent. solution of lead acetate and filtered. The filtrate is mixed with an equal volume of fuming

hydrochloric acid containing 3:1000 of ferric chloride, a few drops of chloroform are added, and the mixture strongly shaken one to two minutes. With normal urine the chloroform remains colorless, or almost so; but if an excess of indoxyl compounds be present the chloroform is colored blue, and the depth of the color is a rough indication of the degree of the excess.

3. *Indications for the use of diuretics:* (1) To remove excessive fluid from the tissues, as in dropsy; (2) to dilute the urine; (3) to promote the elimination of waste products, or poisonous material from the blood; and (4) to maintain the action of the kidneys.

4. A *tubercle* is a small nodule, found in the lungs, etc., in cases of tuberculosis, but also found in other diseased conditions. It consists of three layers, the outer one consisting of lymphoid cells, the middle one of epitheloid cells, and the inner one of giant cells. These layers are squeezed or compressed into a firm mass, which may caseate or undergo other pathological processes. There is no blood supplied to a tubercle. Its *origin* is due to the stimulating or irritating effects of the tubercle bacillus upon the fixed connective tissue elements, causing a round-cell proliferation. The *tissues most frequently invaded by it* are: Lungs, lymphatic glands, bones, joints, intestinal tract, peritoneum, skin, testicle, epididymis, brain, liver, kidneys, spleen, Fallopian tubes, ovaries, uterus.

5. SYPHILIS: "The *primary lesion* is the *chancre,* which starts as a single papule, seldom multiple, at the seat of inoculation, which may be either *genital* or *extragenital.* This soon becomes eroded, superficial necrosis, but increases in size, due to infiltration of the deeper tissues. Is circular or oval, 1 x 1.5 cm., base hard. Edges are sharply defined, induration does not extend much beyond the lesion, and terminates abruptly. Is slightly elevated and is motile, not being adherent to the underlying tissues. Secretion thin and scanty, suppuration unusual, surface may be dry or be covered by a slight false membrane. Histologically there is an infiltration of round cells, particularly along the vessels. Polymorphonuclear leukocytes, lymphocytes, plasma cells, endothelial and connective tissue cells, and fibroblasts are present. The blood-vessels undergo an arteritis, the endothelium is increased in thickness, and obstruction may occur. There is also frequently a hyaline change in the vessels.

The *secondary lesions* are first a swelling and induration of the neighboring lymph nodes. There then appear skin eruptions, polymorphic in character, accompanied by fever, constitutional symptoms, and a rapid decrease in the erythrocytes, with a moderate leukocytosis, usually of the lymphocytes. The skin lesions are generally symmetric,

do not itch, and are coppery in appearance. May be some loss of hair, due to inflammation of the hair follicles. The patches are irregular and have a "moth-eaten" appearance. The *mucous patch* or *condyloma latum* appears on the mucous membrane and the contiguous skin surfaces, particularly those that are naturally warm and moist. It is a slightly elevated, moist, grayish lesion, covered by a thin pseudomembrane. In these there is round-cell infiltration of the skin, with superficial necrosis and edema. There may be one or more patches. Although the chancre and the secondary lesions are highly contagious the mucous patch is probably the most so.

The chief *tertiary* lesion is the *gumma*. It is found most commonly in the nose and nasal septum, scalp, iris, shoulders, arms, and internal organs. The gumma is a nodular mass made up of granulation tissue in which are numerous blood-vessels. It usually undergoes a caseous or other form of degeneration, with ulceration or absorption and subsequent cicatrization. It is hard, dense, and elastic. When the growth of the gumma ceases the younger peripheral cells become organized into connective tissue cells, forming an envelope for the cheesy and gummatous center. This envelope shrinks, the semi-fluid portions are absorbed, and finally a scar, possibly calcareous, is left. The blood-vessels show an endarteritis which closes or narrows the lumen. The remains of broken-down cells and particles of fat are present, and giant-cells may be found."—(Connell's *Pathology.*)

6. In carcinoma lymphatics are found in the stroma, which abounds; in sarcoma there are no lymphatics, but the blood vessels are in direct contact with the tumor cells.

7. Bacteria are classified as follows: (1) the coccus, which is spherical; (2) the bacillus, which is rod-shaped; and (3) the spirillum, which is spiral.

8. Cocci are classified as follows: Diplococci, occurring in pairs; sarcinæ, occurring in bales; streptococci, occurring in chains; and staphylococci, occuring in bundles.

9. The bacterium generally associated with specific urethritis is the gonococcus of Neisser. The gonococcus is a diplococcus, and is recognized by staining with the ordinary aniline dyes, being found inside the pus cells; it is Gram negative, and can be cultivated on human blood serum, but will not grow on the ordinary culture media.

10. *Hydrocele* is a collection of fluid other than pus or blood in the region of the testis or spermatic cord. It is generally in the tunica vaginalis. The fluid is yellowish; if small in amount may be absorbed; may contain cholesterin.

DIAGNOSIS AND THERAPEUTICS.

1. *Glaucoma* is a diseased condition of the eye, pro-

duced by increased intraocular pressure, and resulting in excavation and atrophy of the optic disc, and blindness. It is due to increase of the contents of the eye, hypersecretion, retention, old age, gout, rheumatism, nephritis. *Symptoms:* Visual disturbances, increased ocular tension, hazy and anesthetic cornea, sluggish and dilated pupil, shallow anterior chamber, ciliary neuralgia, cupping of optic disc, blindness. *Treatment:* Myotics, such as eserine or pilocarpine; massage of the eyeball; mydriatics are contraindicated; operative treatment may include paracentesis, iridectomy, or sclerotomy.

2. A *delusion* is a belief in something which has no real existence, but is purely imaginary, and out of which the person cannot be reasoned. An *illusion* is a false or perverted impression, received through one of the senses. An *hallucination* is the same as an illusion, but without any material basis.

If an individual believes himself to be made of glass, and is afraid of being touched lest he be broken, he is suffering from a *delusion.* If the whistling of the wind is mistaken for a voice telling a person to do a certain thing, that would be an *illusion.* If a person fancied he heard a voice when there was nothing at all to be heard, that would be an *hallucination.*

3. *Paralysis agitans* is an affection marked by tremor or alternate contraction and relaxation of the muscles of the part involved. The tremor persists during rest, seldom involves the head, and is little influenced by voluntary movement. The speech is slow, monotonous, and high-pitched, and the face is fixed and expressionless. Muscular weakness is present and later rigidity. When the affection has advanced the typical gait, termed *festination,* is present. It consists in a progressive increase in the rapidity of the gait until a run is developed and the patient falls or seizes some support. The affection is most common in males over forty years, and is of long duration. The treatment is unsatisfactory, and includes rest, nutritious food, tonics, stimulants, hyoscyamin and its alkaloid hyoscin, galvanism, etc.—(*Pocket Cyclopedia.*)

The cause is unknown; it has been attributed to shock, worry, and trauma.

4. In *acute nephritis* the urine is scanty, dark or smoky color, high specific gravity, 1025 or over. Large amount of albumin. Variety of casts, such as hyaline, blood, epithelial, and waxy casts, also free red blood globules, and epithelial cells. Urea diminished.

5. *Intestinal perforation in typhoid fever:* Sometimes there is severe, sudden pain localized in the abdomen, and sometimes there is little or no pain. Marked tympanites, great weakness, collapse, anxious look, small, rapid pulse,

and difficult breathing are present. The legs are apt to be drawn up, and nausea and vomiting may ensue. Hepatic and splenic dullness appear, and leucocytosis may be present. The treatment is surgical; laparotomy, with suture of the intestine, should be done as soon as possible. In the meantime opium (or preferably morphine) should be administered.

6. The initial dose should be 3,000 to 4,000 units of antitoxin in mild cases; and twice the amount in severe and laryngeal cases. It should be repeated in six or eight hours if the swelling and congestion are not diminished.

"The methods used *in the production of antitoxins* were introduced by Behring, who found that by injecting susceptible animals with increasing amounts of extracellular toxin he produced in the blood-serum of the injected animal certain changes which made the serum capable of counteracting the same toxin when injected into other animals. . . . In practice the bacilli are cultivated in bouillon. The cultures are freed from all living bacilli by filtration. The liquid filtrate contains the toxin. This filtrate is injected into healthy susceptible animals, in increasing doses. Usually the horse is used, since large quantities of blood can be drawn from this animal on account of its size, and, moreover, the horse is very susceptible. . . . Eventually enormous doses of toxin are given, and the animal acquires a high degree of immunity. The blood of the animal is withdrawn, taking care to avoid contamination, and the serum allowed to separate in the refrigerator. The serum of the blood is drawn off and constitutes the antitoxin."—(Williams' *Bacteriology*.)

7. *Treatment of abscess of the middle ear:* Leeches, free incision followed by boric acid irrigation or by insufflation of dry boric acid powder. *Complications that may arise:* Eczema, boils, arthritis of temporo-maxillary joint, ankylosis or necrosis of the ossicles, facial paralysis, mastoiditis, subcranial abscess, meningitis, thrombosis of the lateral sinus, cerebral abscess.

8. Digitalis is *indicated* in diseases of the heart: (1) when the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in non-valvular cardiac affections; (4) in irritable heart, due to nerve exhaustion. Digitalis is *contraindicated* in diseases of the heart: (1) in aortic lesions when uncombined with mitral lesions; (2) when the heart action is strong and arterial tension is high.

9. In *diabetes mellitus* the urine contains sugar; in *diabetes insipidus* it contains no sugar.

Treatment of diabetes insipidus: Ergot, pilocarpine, opium, gallic acid, potassium bromide, and sodium salicy-

late have been used. Restriction of water has no effect on the disease.

10. The *patella reflex* is nearly palways *present* in health, and denotes a healthy condition of the entire reflex arc (tendon, afferent or sensory nerve, posterior roots and anterior horn of the spinal cord, the efferent or motor nerve, and the muscle itself). It is *absent* when there is a lesion which affects any part of this reflex are, such as is the case in locomotor ataxia, poliomyelitis, Landry's paralysis, neuritis, in apoplexy just after the shock, and in epilepsy following the convulsion, etc. It is *exaggerated* in: Hemiplegia, lateral sclerosis, general paresis, transverse myelitis, injuries to the spinal cord, hysteria, neurasthenia, tetanus, and strychnine poisoning.

PEDIATRICS AND TOXICOLOGY.

1. TUBERCULOSIS OF THE NOSE: "Tuberculosis of the nose is characterized by the formation of neoplasms or ulceration of the mucous membrane, and often accompanies a general pulmonic tuberculosis. *Symptoms*: In the ulcerated form there is an accumulation of crusts which are blown from the nose. There may be more or less stoppage of the nose, perforation of the septum, and nasal catarrh. In the neoplastic form, there is nasal obstruction and symptoms of hypertrophic catarrh. *Treatment:* In the necrotic form of the disease the nose should be sprayed twice daily with a mild alkaline spray, followed by an oil spray containing acetozone. Small papilla-like growths may be destroyed with the galvano-cautery or removed with snare and scissors. It is advisable to refrain as far as possible from surgical procedure in the nasal cavity in a general tuberculosis. The general treatment is directed to combating the tubercular infection by tonics, sunshine, and outdoor life."

TUBERCULOSIS OF THE EAR. "*Symptoms:* The ear symptoms frequently appear after the lung complications are established. There may be tinnitus, followed by deafness and painless rupture of the drum, and a thin mucous or mucopurulent discharge. On the other hand, the symptoms may vary in no wise from simple acute otitis media. *Treatment:* The surgical treatment is the same as for acute or chronic otitis media. Outdoor exercise and nutritive diet are especially essential."—(J. J. Kyle's *Manual of Diseases of the Ear, Nose, and Throat.*)

TUBERCULOSIS OF THE EYE. "*Tuberculosis of the conjunctiva:* A rare condition, most frequently associated with lupus of the skin of the face. It is characterized by large, soft granulations in the fornices, studded with miliary tubercles. Usually there is some infiltration of the sclerocorneal margin and of the cornea, so that vision

is reduced. *Treatment* is best effected by thorough removal of the granulations by scraping and subsequent insufflation with iodoform." *Tubercular iritis: Symptoms:* "This is most frequently seen in children and young adults. It is of a quiet, painless, and chronic type. Miliary tubercles are to be seen in the iris—small grayish nodules, with a few pink vessels about them. They usually appear at the root of the iris, close into the angle of the anterior chamber, but may affect the border of the iris. Spots of lymph of large size, like spots of mutton fat, may be seen on the back of the cornea, indicating cyclitis. In other cases these symptoms may be complicated by a sclerokeratitis. These are of a more severe order, and shrinkage of the eyeball may result. The diagnosis of tubercle is not easy. We may exclude syphilis by history, by the balance of the symptoms, and by the response to treatment. The reaction to injection of Koch's tuberculin or the newer ophthalmoreaction of Calmette may be utilized, or the aqueous may be tapped and inoculated into rabbits."—(*Aids to Ophthalmology.*)

2. *Tuberculosis of the lymphatic glands* occurs most commonly in people under twenty years of age; hereditary disposition and lowered vitality are predisposing factors. The tubercle bacilli reach the glands either by the blood or lymph or through mucous membrane. The glands are enlarged and firm; later they run together and caseate and frequently suppurate. Later still periadenitis fixes the mass to the deeper structures and to the skin. Still later the abscess bursts on the surface, leaving one or several openings and discharging pus for a long time. *Treatment:* Improve the general health by fresh air, sunshine, arsenic, cod liver oil, iron, and good nourishing food. The gland or whole glandular chain may be dissected out in cases where periadenitis is present. Where there is an unopened abscess, either excise and drain or dissect out.

3. *Pott's disease:* "Inflammation of the vertebræ is usually tuberculous, particularly in children, but it may be due to syphilis, rheumatism, osteoarthritis, or osteitis deformans. There is, also, usually a history of injury. The most common situation is at the junction of the lumbar and dorsal regions, and the bodies of the vertebræ are most often involved. Deformity follows, and depends upon the location and amount of destruction. In most cases the spine sinks forward, the spinous processes project backward, and compensatory curves in the opposite direction are developed above and below. The *symptoms* are pain, tenderness on pressure, rigidity of the back, and a sense of weakness, which may usually be recognized by the child's actions. When suppuration occurs the pus may enter the sheath of the psoas, destroying the muscle, and

presenting in the iliac fossa or groin as an iliac or *psoas abscess;* or it may pass backward through or external to the quadratus lumborum, and point in the loin, when it is known as *lumbar abscess.* In the cervical region *retro-pharyngeal abscess* may occur. Spinal paralysis may come on at any time and myelitis develops in the later stages. The *treatment* in most cases is that of tuberculosis in general. Rest in bed, using sand-bags as splints, is the first consideration. After the acute symptoms have subsided, a Thomas splint, Sayre's plaster cast, or Cocking's felt jacket may be applied to the back and the patient gradually allowed to move about. *To apply the plaster-of-Paris case,* the patient should be suspended so that the heels are just off the ground. A skin-fitting vest is then applied to the trunk, under which a stomach-pad is inserted, which should be removed after the plaster has become dry. Plaster bandages should now be applied in the usual manner, extending from the level of the axilla to just below the crest of the ilium. When the case is dry, it may be divided down the front and perforated, so that it can be laced up or removed at any time. Ascesses should be opened early and freely, and injections of iodoform emulsion will be found very beneficial. Laminectomy is sometimes advisable." (Gold and Pyle's *Pocket Cyclopedia.*)

4. *Scabies* is a contagious, animal, parasitic disease, due to the *Sarcoptes scabiei,* characterized by burrows and a multiform eruption, and attended by severe itching. The eruption usually occupies certain areas where the skin is thin; these are the interdigital spaces, the flexor surface of the wrist and arm, the anterior and posterior axillary folds, the mammæ and nipples (in women), the umbilicus, the buttocks, the penis, the inner side of the thighs and legs, and the toes. The face is exempt except occasionally in infants. The itching is intense and worse at night. The affection is curable, but dermatitis may result from over-treatment. *Treatment* consists in a thorough scrubbing with soap and warm water, followed by friction to dry the skin, and the application of sulphur ointment, the latter to be repeated morning and night for three days. The whole process may need to be repeated one or more times.

5. *Pemphigus* is an acute or chronic inflammatory disease of the skin, characterized by the formation of successive crops of variously sized, rounded or oval bullæ affecting seriously the general health and sometimes terminating fatally. The blebs of pemphigus are tense, abruptly elevated, noninflammatory, and come out in crops. *Varicella* is an infectious disease. The eruption usually appears first on the trunk, is evident on the first day, comes in successive crops, is not shotty, and disappears on stretching the skin; the spots are unilocular, and collapse on being

punctured. The period of incubation is from four to fourteen days.

6. *"Acute catarrhal otitis media* is frequently caused by acute coryza and the infectious fevers. There is a painless obstructed sensation in one or both ears, impairment of hearing, and tinnitus. The inflammation causes closure of the Eustachian tube. Inflation and aspiration of the middle ear and syringing and douching the nares and nasopharynx must be avoided. A moderate spray of Dobell's solution may be used. If pain is present, dry heat, in the form of hot-water bottle, hot stone wrapped in flannel, etc., may be applied. A few drops (100), warmed, of a carbolic acid solution (1:40), or one of formalin (1:2000), may be instilled into the ear.

"Acute purulent otitis media: Acute catarrhal otitis media, instead of undergoing resolution, may pass into acute purulent otitis media (especially in exanthemas) from the passage of pathogenic germs from the nasopharynx into the middle ear. The pain will become more intense, the hearing dull; tinnitus will become louder and more distressing, and fever usually sets in. Dry heat allays the pain. Warmed water or warmed carbolic acid solution (1:40) may be used. Inflations, aspirations, etc., should be avoided. If the nares are filled with tough secretions, a spray of Dobell's solution may be used. If the pain continues over six hours in a child or over twelve hours in an adult without spontaneous perforation of the tympanic membrane, paracentesis of that structure should be performed. The concha and meatus should be smeared with petrolatum to avoid chapping, and the secretions should be gently mopped off as they appear. Under this treatment the ear usually returns to normal in two to three weeks." (Gould and Pyle's *Pocket Cyclopedia of Medicine and Surgery.*)

7. The patient will probably be found with pulse increased in frequency and fulness; the respirations more rapid, much general nervous excitement, and general hyperesthesia. Empty the stomach, give stimulants; adrenalin is said to be antagonistic; nitroglycerine, amyl nitrite, ammonium carbonate and strychnine, and caffeine have all been recommended. Artificial respiration may be necessary; mustard plaster over the heart and stomach may give relief.

8. The patient is now probably in the stage of depression, with shallow breathing, rapid heart action, and pale or cyanotic face. Chloroform or ether may be given subcutaneously, and the measures mentioned in question 7 may be adopted.

9. Alcohol (four to eight ounces of whiskey) followed

by water is probably the best treatment when seen immediately. Later on some soluble sulphate, such as sodium sulphate or magnesium sulphate, is the proper treatment.

10. In *poisoning* by *hydrocyanic* acid, death is probably due to asphyxia; by *aconite*, to asphyxia; by *morphine*, usually to paralysis of respiration, occasionally to paralysis of the heart; by *atropine*, to paralysis of respiration; by *strychnine*, to fixation of respiratory muscles.

SURGERY.

1. EMPYEMA. *Etiology:* Wounds, injuries, pleuropneumonia, direct extension of a suppurative process in the lung, abdomen, or neck. The bacteria will vary with the cause; *Diplococcus pneumoniæ* is the commonest; tubercle bacillus, staphylococcus, streptococcus, *Colon bacillus* may also be present.

Pathology: The organisms causing it are pneumococci, streptococci, staphylococci, tubercle bacilli, *Bacillus coli*, and actinomycosis.

The physical signs are those of fluid in the pleural cavity; that side does not move well, the percussion note is dull, there is absence of breath sounds, vocal fremitus and resonance are diminished. Left alone, an empyema may burst through an intercostal space, usually the fifth. The lung is collapsed in extent according to the amount of pus. The pleura, at first covered with lymph, soon becomes covered with layers of granulation tissue, the deeper part of which is converted into fibrocicatricial tissue, and the lung itself also undergoes some fibroid change. If the pus is let out early the lung and pleura soon expand, but if allowed to go on the infiltration of the lung and the density of the scar tisue covering it hinder expansion. Nature attempts to remedy this in various ways. (1) The other lung expands and pushes the heart over to the opposite side; (2) the chest wall falls in, the intercostal spaces are obliterated, and the spine is curved, with its concavity toward that side; (3) the abdominal viscera are pushed up; and (4) exuberant granulations form on the pleura. If a cavity still remains an operation is necessary.

Symptoms: Fever, sweats, chill, diminished breath sounds and vocal fremitus, impaired mobility of chest, dullness on affected side, heart displaced to opposite side, leucocytosis.

Treatment: Aspiration, drainage, irrigation, resection of ribs (Estlander's operation), or resection of chest wall (Schede's operation).

If *not treated*, the lung becomes collapsed, the pleura thickened and adherent, heart and mediastinum displaced, chest wall falls in, fistula may form; the condition may be fatal.

2.

CHANCRE	CHANCROID
First lesion of a constitutional disease, viz., syphilis.	A local disease.
Due to syphilitic infection.	Due to contact with secretion from chancroid.
Generally a venereal infection.	Always a venereal infection.
May occur anywhere on the body.	Nearly always on genitals.
Period of incubation never so short as ten days.	Period of incubation always less than ten days (generally about three).
Generally single.	Generally multiple.
Not autoinoculable.	Autoinoculable.
Secretion slight.	Secretion profuse and purulent.
Slightly or not at all painful.	Generally painful.
As a rule only occurs once in any patient.	May reoccur in same patient.
Buboes are painless and seldom suppurate.	Buboes are painful and usually suppurate.

Chancre should be kept clean, washed with lotio nigra, and mercury may be given internally. *Chancroid* should be kept clean, washed with lotio nigra, the prepuce should be attended to if necessary, also buboes.

3. There is history of injury, pain, inability to use forearm or hand, pronation and supination are impossible, crepitus may be obtained. In treatment it is important to fix the elbow, and to prevent lateral compression of the fragments, or the four ends may unite in one mass. If above the insertion of the pronator teres, the arm must be put up supinated; if below, midway between pronation and supination.

4. *Nonunion of fracture is caused by:* Ill health, want of approximation of the end of the bone, want of blood supply in the bone, defective innervation of the bone, disease of the bone, lack of rest, and immobility. *Treatment:* "When delayed union exists, seek for a cause and remove it, treating constitutionally if required and thoroughly immobilize the parts by plaster. Orthopedic splints may be of value. Use of the limb while splinted, percussing over the fracture, and rubbing the fragments together, thus in each case producing irritation, have all been recommended. Blistering the skin with iodine or firing it has been employed. If the case be very long delayed, forcibly separate the fragments and put in plaster as a fresh break.

If these means fail, irritate by subcutaneous drilling or scraping, or, better, by laying open the parts and then drilling and scraping at many places."

5. *Fissure* is characterized by intense pain on defecation; walking or coughing may cause pain; on stretching the skin the ulcer can be seen. *Fistula:* Pain on movement or defecation, discharge of a muco-purulent fluid, and general ill health. A probe may show the direction and depth of the fistula. *Hemorrhoids:* A mass may be seen, either externally or within the sphincter.

Treatment of fissure: Anesthetize the patient, stretch the anus with the thumb until the sphincter yields and the fissure tears asunder. This paralyzes the muscle for several days, during which time the fissure heals.

6. ASCITES is *caused* by: Mechanical obstruction of the portal circulation; cardiac or pulmonary diseases obstructing the general venous circulation; diseases of the peritoneum; diseases of the kidneys; anemia, debility, exposure to cold or wet; cancer, syphilis. *Symptoms:* Generally of gradual onset; abdominal distention, sense of weight and fulness; dyspnea; gastrointestinal disturbances; lineæ albicantes, presence of fluid may be detected by palpation, percussion, or aspiration. If due to heart or lung disease ascites will occur elsewhere, and the legs are generally affected first; in hepatic disorders the abdominal distention is marked, and appears early; in renal disease the abdominal fluid is generally small in amount. *Treatment:* Tapping, drainage, incision, and administration of cathartics have all been recommended. Ovarian tumor, pregnancy, distended bladder, pancreatic cyst, and echinococcus cyst may be mistaken for it. *Ascites is characterized by:* Enlargement of the abdomen, most marked in the flanks when the patient is lying on his back, and in the hypogastrium, when he is standing up; there are dilated superficial veins on the abdomen, and the skin is tense; the umbilicus is prominent; there are fluctuation and vibration on palpation; dulness is found on percussion over the fluid, while the center of the abdomen is resonant.

7. RENAL CALCULUS. *Etiology:* AGE.—Found at all ages. Clinically very rare below ten years; common between twenty and fifty. SEX.—Slight preponderance of males. HEREDITY.—In uric acid stone there is generally a well-marked family history. SIDE.—Right and left equally affected. HABITS.—Sedentary life and rich diet. WATER.—Lime in drinking water. CLIMATE.—More frequent in hot countries, because evaporation and sweating concentrate the urine. INJURY.—May give rise to calculus round a blood-clot, or first give symptoms by moving a calculus that has been present.

The *Symptoms* consist of pain in the loin, markedly increased by exercise, especially on jolting. The pain may be referred to the thigh, groin, or testicle. The colic is associated with hematuria, and often pyuria exists with frequency of micturition. The kidney may be enlarged, and tender on pressure. A large stone may exist without any symptom whatever.

The most typical symptom consists in a sudden attack of excruciating and paroxysmal pain shooting down the loin to the bladder and testis. The attack is accompanied by vomiting, faintness, and collapse. Frequent efforts to pass urine are made, but only a scanty amount of blood-stained urine is passed (strangury). The pain ceases suddenly when the calculus slips back into the pelvis or reaches the bladder.

Treatment—Palliative.—The patient's diet must be regulated so that there is no excess; plenty of fluid should be taken as well as proper exercise. Alkaline purgatives and urotropin should be ordered. Sometimes under this treatment a small stone becomes encysted, but it is unlikely that a stone once formed will be dissolved. Renal colic is treated by hot baths, ½ grain of morphine, or chloroform, to relieve the pain.

Operative treatment is adopted if the above means fail, if a perinephric abscess forms, or a stone is impacted in the ureter. Nephrolithotomy is the ideal operation, but if the kidney is converted into a mere abscess cavity nephrectomy is necessary. Nephrectomy should not be done if it is suspected that the other kidney is also affected. (*Aids to Surgery.)*

8. ***Prostatic hypertrophy is characterised by:*** Slowness in starting urination; difficult micturition; frequency of micturition, particularly at night; the presence of residual urine; dull, aching pain in the perineum and above the pubes; enlargement of the lateral lobes of the prostate; there may be cystitis and retention of urine. The *cause:* It is a senile change, and may be due to increase of the glandular substance or of the interstitial fibrous or muscular tissue. *Palliative treatment* consists in: Mild and unirritating diet, avoidance of alcohol, taking plenty of milk or water, or other diluent. Alkalies and sedatives should be taken, also urotropin or other antiseptic so as to prevent cystitis. Regular catheterization, at least once a day, preferably in the evening, and with due aseptic precautions.

9. *Psoas abscess* is a cold abscess in the sheath of the psoas muscles, the pus generally comes from tuberculous disease of the vertebræ. *Treatment:* (1) Aspiration and injection; (2) or incision and suture; (3) or radical operation, removal of the focus of tuberculosis.

OBSTETRICS AND GYNECOLOGY.

1. ANESTHETICS are used in labor to lessen suffering produced by labor pains; to lessen the pain attending obstetric operations; to relax the uterus when its rigid contraction interferes with version; to promote dilatation of the os uteri; to reduce excessive nervous excitement which may interfere with progress of early stage of labor; to relieve eclamptic convulsions and mania; in cases of uterine inversion to relax the constricting cervix and so facilitate replacement; in bipolar version to lessen pain of introducing the hand into vagina; in precipitate labor to suspend action of voluntary muscles and retard delivery; in all cutting operations upon the abdomen; and sometimes in sewing up a lacerated perineum when many sutures are required. (From King's *Obstetrics.)*

Dangers: It lessens the efficiency of the uterine contractions; it predisposes to postpartum hemorrhage; and, if given too freely, may be followed by headache, nausea, and vomiting.

Chloroform is the easiest to give, and it should be given a drop at a time on gauze in a Schimmelbusch's mask.

2. The second stage of labor begins when the os is fully dilated, and terminates with the expulsion of the child. Conditions which may cause delay are rigidity, edema, atresia, or displacement of the os or cervix; fibrous bands or atresia of vagina; persistent hymen; unyielding perineum; tumors; distended bladder or rectum; hernia; edema of labia; pelvic deformities; malpositions or malpresentations of the fetus; prolapse of limbs; short cord; large fetus; dead fetus; twins or monstrosities; uterine inertia; rupture of uterus.

3. Toxemia of pregnancy is an acute morbid condition, probably due to the absorption and non-elimination of harmful products of metabolism. *Causes* are said to be: Uremia, albuminuria, imperfect elimination of carbon dioxide by the lungs, medicinal poisons, septic infection; predisposing causes are renal disease and imperfect elimination of the skin, bowels, and kidneys. The *symptoms* are: "Headache, nausea, and vomiting, epigastric pain, vertigo, ringing in the ears, flashes of light or darkness, double vision, blindness, deafness, mental disturbance, defective memory, somnolence; symptoms easily explained by the circulation of toxic blood through the nerve centers. These may be preceded by lassitude, and accompanied by constipation or by diarrhea. Headache is perhaps the most significant and common warning symptoms. In bad cases the urine is reduced in quantity (almost suppressed), very dark in color, its albumin greatly increased, so that it becomes solid on boiling. Next comes the final catastrophe

of convulsions. The convulsive fit begins with twitching of the facial muscles, rolling and fixation of the eyeballs, puckering of the lips, fixation of the jaws, protrusion of the tongue, etc., soon followed by violent spasms of the muscles of the trunk and limbs, including those of respiration; hence lividity of the face and stertorous breathing, biting of the tongue, opisthotonus, etc. The fit lasts fifteen or twenty seconds, ending in partial or complete coma, possibly death; or consciousness may return, to be followed by other convulsions." (King's *Manual of Obstetrics.)*

Preventive treatment: (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment* includes: (1) Controlling the convulsions (by chloroform, veratrum, or chloral); (2) elimination of the poison or poisons which are presumed to cause the convulsions; (3) emptying the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

4. *Endometritis* is inflammation of the mucous membrane lining the uterus. The acute form is due to the introduction of septic bacteria, and is manifested by pain, constipation, irritability of bladder, rapid pulse, rise of temperature, and a profuse discharge. *Treatment* following miscarriage or labor consists in curettage, intrauterine hot sterile douche, free purgation, hot stupes over the lower abdomen, milk diet and stimulants. Chronic endometritis may accompany numerous pathological uterine conditions, but is generally due to gonorrhea. The symptoms are backache, headache, leucorrhea, profuse menstruation, and impairment of the general health. *Treatment* consists in removing the cause when possible, and when due to gonorrhea curettage and irrigation of the uterus, with the application of an antiseptic.

5. Spontaneous labor may occur; if it does not, put the woman in Walcher's position, and if the head descends into the pelvis place the woman on her back If the child should die craniotomy is indicated.

6. Prolapse of cord may be due to placenta prævia, violent expulsion of the liquor amnii, hydramnios, and violent jolts. *Treatment of placenta prævia:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

7.

VIRGIN UTERUS	UTERUS OF MULTIPARA
The cavity is of normal length and triangular.	The cavity is increased in length, and oval.
The cervix is small, hard, and cartilaginous, and of the same length as the body.	The cervix is large and soft; it is about one-half the length of the body.
The external os is a transverse slit or pinhole orifice with smooth edges.	The external os is irregular and its edges are fissured.
The sides of the cavity of the body are convex inward.	The sides of the cavity of the body are convex outward.
The uterus is normally anteflexed.	The uterus is straighter, or even retrodisplaced.
There is more or less flattening of the anterior and posterior uterine surfaces.	The contour of the uterus is more rounded, while its diameters are increased.
The fundus is nearly flat.	The fundus is convex.
The internal os is closed.	The internal os is patulous.

(From Dorland's *Obstetrics.*)

8. "Tears of the perineum destroy the integrity of the pelvic floor and result eventually in rectocele, cystocele, hemorrhoids, and displacements of the pelvic organs. If the tear involves the sphincter ani, incontinence also results. Lacerations of the cervix retard or check involution of the uterus and predispose to endometritis, menorrhagia, displacements, eversion of the cervical mucous membrane, cystic degeneration, and malignant disease. Deep lacerations of the vaginal vault may open into the base of the broad ligaments, and in the majority of instances genitourinary fistulas are caused by traumatisms of labor. All lacerations are immediately dangerous on account of the increased liability to sepsis, while the remote results are generally due to interference with involution or the pelvic circulation and to the destruction of the normal supports of the pelvis."—(Ashton.)

All tears should be repaired as soon as possible (unless there are contraindications). A primary operation is best because the edges are fresh and can be approximated; little (if any more) anesthetic is wanted; the woman has to lie in bed, and therefore only one absence from household work is requisite; infection is less likely. In any case, operation may prevent rectocele, cystocele, prolapse of uterus, and general weakness, malaise, and disability. For technique, see any text-book on obstetrics or gynecology.

9. Leucorrhea from the vagina is whitish in color, of a creamy consistency. When from the body of the uterus it is a thin, clear, watery, colorless fluid. From the cervix it is a clear, transparent, tenacious, glairy fluid, like white of egg. By means of a speculum the discharge can be seen coming from the uterus in the two latter conditions.

10. *Symptoms:* Pain and burning in the vulva and on micturition; dyspareunia; yellowish or greenish discharge containing the gonococcus; the vagina is hot, red, swollen, and tender. *Possible results:* Cystitis, urethritis, vulvitis, endometritis, salpingitis, septic peritonitis, sterility, condylomata of vulva, abscess of Bartholin's glands.

STATE BOARD EXAMINATION QUESTIONS.

MICHIGAN STATE BOARD OF REGISTRATION IN MEDICINE.

ANATOMY.

1. Give the origin, insertion, and action of the rectus femoris.
2. Describe the scapula, and name the muscles attached to it.
3. Describe the collateral circulation after ligature of the common carotid artery.
4. Describe the inferior maxillary bone, and name the muscles attached to it.
5. Describe the deep palmar arch, and give its formation.
6. On examination of the under part of the brain, what structures and anatomical features will you observe?
7. Give the arterial and nerve supply of the pharynx, and mention the openings into it.
8. Describe the great superficial petrosal nerve.
9. Describe the solar plexus and give its situation.
10. Describe the knee joint.

HISTOLOGY AND EMBRYOLOGY.

1. Describe the blood.
2. Does fetal blood and blood pressure differ from that of the mother? If so, how?
3. Describe the structure of the lungs.
4. Give the histology of the thyroid gland.
5. Describe the kidney.

PHYSIOLOGY.

1. What are the manifestations of cell life? Metabolism? Explain significance, and give classification.
2. Name the nerve centers which regulate intestinal peristalsis. Describe their action.
3. Name end products resulting from digestion of the

three principal types of food, and explain how and by what channels they enter the circulation.

4. What is the physiological significance of the patellar reflex, and through what nerves is it accomplished?

5. Name the varieties of blood that circulate through the liver. State the source and give the function of each.

6. What purpose is served in boiling starchy foodstuffs, and when can a given amount be said to have been completely digested?

7. Why do we breathe? What sounds are heard on listening to the chest? Where is the respiratory center located?

8. Give three examples illustrating the value of a knowledge of physiological chemistry.

9. Describe the special function possessed by each nerve factor concerned in a vasomotor action, and state how either affects arterial tension.

10. What changes take place in the composition of blood as it passes through the kidneys?

CHEMISTRY AND TOXICOLOGY.

1. Name the constituents of the atmosphere. Is air a mechanical mixture or a chemical combination of its constituents, and why? What part does carbonic acid play as regards vegetation? State the laws of gaseous diffusion.

2. Give the equations showing the action of sulphuretted hydrogen on solutions of copper sulphate and on alkaline hydroxide; also equations covering the production of carbon dioxide.

3. What is the difference between atoms and molecules of the elements? What volume does the molecule occupy in the gaseous state? Give examples.

4. Give the characteristics of good drinking water, with method of determining same.

5. Name the more important of the petroleum products and their uses.

6. Name three aromatic hydrocarbons, with formulæ.

7. Describe the groups of the compound proteids.

8. Give a list of the xanthin and creatinin groups of leucomaines.

9. Symptoms and treatment of poisoning by poison ivy. What active principle is involved?

10. Symptoms and treatment of poisoning by strychnine.

MATERIA MEDICA AND THERAPEUTICS.

1. Name the toxic and physiological action of atropine and morphine.

2. What is the true and toxic action of calomel and iodide of potassium?

3. What are the potassium salts used in medicine?

4. What are depresso motors? Excito motors? Oxytoxics? Mydriatics? Alteratives? Give examples of each class.

5. Give examples of drugs which affect the heart action, their doses, and principal actions.

PATHOLOGY.

1. Mention some of the determining causes of disease.

2. Explain the effect of overfeeding upon the body.

3. Mention and define the forms of hemorrhage.

4. What constitutes fatty infiltration? Give etiology and favorite seats.

5. Describe the phenomena of inflammation in vascular tissues.

6. Osteoma: Give general appearance, seats, and structure of.

7. Define glioma. Give its seats, minute structure, and nature.

8. By what term do we designate the destruction of red-blood cells? Give etiology.

9. Etiology and pathological anatomy of aneurysm.

10. What is the condition of the kidney in chronic interstitial nephritis? How is the urine affected?

BACTERIOLOGY.

1. Describe the *Bacillus typhosus*, and briefly tell how you would differentiate it from *Bacillus coli communis*.

2. Describe fully the organism recognized as the cause of syphilis.

3. Define immunity, active and passive, natural and acquired.

4. Describe fully the different modes of multiplication in bacteria, and spore formation.

5. What are bacterial enzymes?

PRACTICE OF MEDICINE.

1. Describe the characteristic symptoms and course of scarlet fever.

2. Discuss the diagnosis, symptoms, and treatment of whooping cough.

3. Discuss pericarditis and its treatment.

4. Describe a method of anesthesia you prefer for your patients.

5. Describe the symptoms present in: (*a*) Carcinoma of the stomach; (*b*) gastric ulcer; (*c*) duodenal ulcer.

6. Outline the management of a case of lobar pneumonia.

7. Give in detail your advice to a young patient in the earliest stage of tuberculosis.

8. Mention some drugs which lower blood pressure, and give a theory of their action.
9. Give the therapy of acute cystitis.
10. Mention some complications which may follow typhoid fever.

OBSTETRICS.

1. What is "hour-glass contraction"? How would you overcome it to remove adherent placenta?
2. Describe placenta prævia, and how would you treat it during labor?
3. How would you manage a face presentation?
4. Give the cause, treatment of puerperal eclampsia, insanity, and septicemia.
5. How would you diagnose a shoulder presentation, and its correction?

GYNECOLOGY.

1. Describe the uterus, its shape, dimensions, cavities, parts, openings, structure, lining, membranes, secretions, ligaments, nerves, etc.
2. Describe the vulvovaginal glands.
3. What are the causes of downward displacements of the uterus?
4. What is the organ most frequently affected in tuberculosis of the pelvis?
5. What are the symptoms of extrauterine gestation?

SURGERY.

1. Give the most approved methods of treatment of hemorrhoids.
2. Describe fully the best method of procedure in case of recurring dislocation of the sternal end of the clavicle.
3. What signs and symptoms are always present in fractures? What are usually present?
4. Describe the best management of penetrating wounds of the skull caused by gunshot.
5. Give full description of operation of thyroidectomy.
6. Give the conditions under which resection of the bowel should be undertaken.
7. What is general anesthesia? How is it produced? What are the dangers to be avoided, and how?
8. Under what condition should the common carotid be ligated? Describe the operation.
9. What is surgical shock, and how would you relieve it?
10. Under what circumstances should appendicostomy be resorted to? Give technique of operation.

HYGIENE.

1. What is the difference between disinfectants and ger-

micides, and how do they severally act in preventing the spread of contagious and infectious materials.

2. What disease-carrying bacilli may be conveyed to the system by the ingestion of milk? What are the microscopic characteristics of such bacilli?

3. Mention three satisfactory disinfectants, and give indications for their use.

4. What deleterious gases accumulate in imperfectly ventilated sleeping rooms?

5. Name five diseases requiring quarantine regulations, and state the time necessary for each.

EYE, EAR, NOSE, AND THROAT.

1. Describe, in detail, how you would treat a chemical burn of the eyeball.

2. Give indications and contraindications for tracheotomy and intubation.

3. Give causes, symptoms, prognosis, and treatment of chronic suppurative otitis media.

4. Differentiate between trachoma and conjunctivitis. Give prognosis and treatment for trachoma.

5. Describe, in detail, the syphilitic conditions that may be found in the nose and throat.

MEDICAL JURISPRUDENCE.

1. Define: (*a*) Medical jurisprudence; (*b*) expert testimony; (*c*) civil malpractice; (*d*) criminal malpractice.

2. Give post-mortem appearances due to: (*a*) Asphyxia; (*b*) drowning; (*c*) strangulation.

3. Describe a proper medical investigation in a suspected case of homicide.

4. How would you determine whether a wound or burn was inflicted before or after death?

5. What is insanity? Distinguish between intellectual and moral insanity.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

MICHIGAN STATE BOARD OF REGISTRATION IN MEDICINE.

ANATOMY.

1. RECTUS FEMORIS. *Origin:* Anterior inferior, spine of ilium; and groove above the brim of the acetabulum. *Insertion:* Into the patella. *Action:* It helps to extend the leg upon the thigh and aids in supporting the pelvis and trunk upon the femur.

2. *Scapula* is a flat triangular bone situated in the upper postero-lateral aspect of the thorax, from the second to the

seventh rib. It consists of a body, head, neck, acromion and coracoid processes, and has two surfaces, three borders, and three angles. The anterior surface presents the subscapular fossa; the posterior surface presents the spine, and supraspinatus and infraspinatus fossæ. The suprascapular notch is at the base of the coracoid process. The glenoid cavity is for articulation with the head of the humerus. The acromion process overhangs the glenoid cavity. The *muscles attached* are: Subscapularis, supraspinatus, infraspinatus, trapezius, deltoid, omohyoid, serratus magnus, levator anguli scapulæ, rhomboid major and minor, triceps, teres major and minor, biceps, coraco-brachialis, and pectoralis minor.

3. After ligature of the common carotid artery the collateral circulation is: (1) The superior thyroid (of external carotid) with inferior thyroid (of subclavian); (2) the profunda cervicis (of subclavian) with the arteria princeps cervicis (of occipital); (3) the transversalis colli with the occipital; (4) branches of the two vertebrals, with branches of the two external carotids; (5) by the circle of Willis.

4. *Inferior maxilla* consists of a body and two rami. The body is horse-shoe shaped and contains the lower teeth; externally it presents the symphysis, mental process, mental foramen, incisive fossa, and external oblique line; internally it presents the four genial tubercles, sublingual fossa, internal oblique line, submaxillary fossa. The alveolar border has sixteen cavities for teeth. The ramus is quadrilateral, and presents the inferior dental foramen and a spine. Above it has the coronoid and condyloid processes, separated by the sigmoid notch. The *muscles attached* are: Levator menti, depressor labii inferioris, depressor anguli oris, platysma myoides, buccinator, masseter, orbicularis oris, geniohyoid, geniohyoglossus, mylohyoid, digastric, superior constrictor of pharynx, temporal, internal and external pterygoids.

5. The deep palmar arch extends from the base of the first interosseus space to the base of the fifth metacarpal bone, and is about one finger's breadth nearer to the wrist than the superficial palmar arch is. It is covered by the superficial and deep flexor tendons, adductor obliquus pollicis, parts of flexor brevis minimi digiti and of opponens minimi digiti. It rests upon the adductor, transversus pollicis, the distal extremities of the metacarpal bones, and the interossei muscles. It is accompanied by the deep branch of the ulnar nerve, and two venæ comites.

The *deep palmar arch* is formed by the radial artery, and is completed by the radial artery anastomosing with a deep branch of the ulnar. Its branches are the palmar interosseous, perforating, and palmar recurrent arteries. The

surface marking is a line drawn transversely across the palm, one-half inch nearer the wrist than the superficial arch.

6. *On the under surface of the brain* there are: (1) *In the middle line:* Longitudinal fissure; Rostrum and peduncles of corpus callosum; Lamina cinerea; optic commissure; Pitiutary body; Infundibulum; Tuber cinereum; Corpora albicantia; Posterior perforated space; Pons; Medulla. (2) *On each side of the middle line:* Frontal lobe; Olfactory bulb, tract, and roots; Anterior perforated space; Fissure of Sylvius; Optic tracts; Crusta; Temporal lobe; Hemisphere of cerebellum.

7. PHARYNX. *Arterial supply:* Ascending pharyngeal, pterygo-palatine, superior or descending palatine, superior thyroid, descending palatine, and tonsillar. *Nerve supply:* From pharyngeal plexus (from vagus, glossopharyngeal, and sympathetic) and from external and recurrent laryngeal nerves. *Openings:* Two posterior nares, two Eustachian tubes, mouth, larynx, and esophagus.

8. The *great superficial petrosal nerve* is given off from the geniculate ganglion of the facial nerve; it passes through the hiatus Fallopii, enters the cranial cavity, and runs on the anterior surface of the petrous portion of the temporal bone. It joins with the large deep petrosal nerve, to make the Vidian nerve.

9. The *solar plexus* consists of ganglia and nerve branches, derived chiefly from the splanchnic nerves and the right vagus. It is situated behind the pancreas and in front of the aorta and the crura of the diaphragm. It surrounds the celiac axis and the part of the superior mesenteric artery.

10. THE KNEE-JOINT is a ginglymoid articulation formed above by condyles of femur, below by head of tibia, and in front by patella. Its *ligaments* are divided into two sets, the external, consisting of anterior, posterior, internal lateral, two external laterals, and capsular; and internal, consisting of anterior, posterior, two semi-lunar, fibro-cartilages, transverse, coronary, ligamentum mucosum, and ligamenta alaria. Its joint surface is the most extensive in the body.

HISTOLOGY AND EMBRYOLOGY.

1. The blood is a fluid tissue composed of cellular elements (red corpuscles, white corpuscles, and platelets) and intercellular substance, or liquor sanguinis, or plasma. The *red blood corpuscles* are biconcave discs, about 1-3200 of an inch in diameter; they are nonnucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They are elastic and soft, and their shape is changed by pressure, but is promptly regained on the

removal of the pressure. Their color is yellowish. They contain hemoglobin.

The *leucocytes*, or *white blood cells*, are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into: (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen, lymphatic glands, and lymphoid tissues. Their fate is uncertain; it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells.

The *platelets* are very small, colorless, irregularly shaped bodies; about one-fourth the diameter of a red cell. They vary in number from 200,000 to more than 500,000 per cubic millimeter.

2. *Fetal blood* has a lower specific gravity; the red cells vary greatly in size and shape, are nucleated, and are deficient in hemoglobin; the white cells have a different proportion of their various kinds, the mononuclears preponderating. Wth regard to *fetal blood pressure*, nothing definite is known.

3. "The lungs consist of: Lobes; lobules, bronchi, terminal bronchioles, alveolar passages and infundibula; air sacs; blood-vessels and nerves.

The *lobes* are the primary divisions, the right having three, the left two.

Lobules.—The lobes are divided into *lobules* of various sizes, their outline being most readily seen on the cut surface of fetal lungs; they are separated by fine connective tissue. In structure they resemble a lung in miniature, having a terminal bronchiole, and a branch of the pulmonary artery and vein.

The *Bronchi*, on entering the lung, divide and redivide each of the smaller divisions entering a lobule. In structure they resemble the trachea, with some modifications. The *cartilages* in the larger tubes form more or less complete rings, but as the tubes get smaller the cartilages form incomplete rings consisting of small plates in the walls arranged in a circular manner, and finally are wanting altogether in tubes of 1 mm. in diameter. The *muscular fibers* entirely surround the tubes, and may be traced into the finest ramifications. The *elastic fibers* extend to tubes of the smallest size, and become continuous with the elastic fibers forming the walls of the infundibula. The ciliated epithelium ceases before their entrance into the infundibula.

Terminal bronchioles and infundibula. After repeated subdivisions, the bronchial tube, when reduced to 1 mm., is called a *terminal, lobular,* or *respiratory bronchiole.* Each terminal bronchiole ends in one or more enlarged passages called the *alveolar passages* or *ducts,* from which are given off blind dilatations, the *infundibula* or *end-sacs.* The walls of the terminal bronchioles are in part, and the walls of the alveolar passages and infundibula are completely beset with a number of *air-cells* or *alveoli,* which open into them by wide apertures. In the terminal bronchioles the cartilages have disappeared, and the cylindrical ciliated epithelium is being replaced by a layer of pavement epithelium, so that their walls consist of (*a*) a layer of pavement epithelium; (*b*) a muscular coat of non-striated fibers; (*c*) a thin layer of elastic fibers. The muscular coat is continued into the alveolar passages and infundibula, but does not surround the air-cells.

Air cells are about 1/100 inch in diameter; they are lined internally by flattened, transparent nucleated cells, continuous with those of the infundibula, and their walls are formed by the elastic fibers continuous with the elastic tissue of the bronchi and its divisions.

Pulmonary vessels and lymphatics. The pulmonary arteries accompany the bronchial tubes, and, like them, do not anastomose. Their terminal arterial branches, 1/1000 inch in diameter, lie between the air-sacs, and send a network of capillaries over them. The *bronchial arteries,* two or three in number, arise from the aorta, are distributed to the bronchi, lymphatic glands, connective tissue, and mucous membrane. The right bronchial vein enters the vena-azygos, and the left the superior intercostal vein. The *deep lymphatics* arise from the lacunæ or spaces occupied by the connective-tissue cells in the elastic tissue around the air-sacs, and eventually enter the bronchial lymph-glands." (Ashby's *Physiology.)*

4. "The *thyroid gland* is invested by a thin layer of areolar tissue which not only binds it fast to the trachea, but divides it into small lobules of irregular size and form. It is a ductless gland consisting of epitheal vesicles varying in size from .05 mm. to 1 mm. in diameter. These vesicles vary greatly in form and are grouped and held together by areolar connective tissue in which many blood-vessels ramify. These vesicles are generally filled with *colloid substance,* a yellow viscid fluid, that in sections stains a yellowish red with eosin. They are lined by a simple cubical epithelium made up of two kinds of cells, (1) a smaller number of *colloid cells* engaged in the production of colloid, and (2) intervening *chief cells* which replace the former in case they are lost." (Hill's *Histology.*)

5. "The kidney is a compound, tubular gland composed of microscopic tubules whose function it is to secrete from the blood those waste products which collectively constitute the urine. If the apex of each pyramid be examined with a lens, it will present a number of small orifices, which are the beginnings of the uriniferous tubules. From this point the tubules pass outward in a straight but somewhat divergent manner toward the cortex, giving off at acute angles a number of branches. From the apex to the base of the pyramids they are known as the tubules of Bellini. In the cortical portion of the kidney each tubule becomes enlarged and twisted, and after pursuing an extremely convoluted course, turns backward into the medullary portion for some distance, forming the descending limb of Henle's loop; it then turns upon itself, forming the ascending limb of the loop, re-enters the cortex, again expands, and finally terminates in a spheric enlargement known as *Müller's* or *Bowman's capsule*. Within this capsule is contained a small tuft of blood-vessels, constituting the *glomerulus*, or *Malpighian corpuscle*. Each tubule consists of a basement membrane lined by epithelial cells throughout its entire extent. The tubule and its contained epithelium vary in shape and size in different parts of its course. The termination of the convoluted tube consists of a little sac or capsule, which is ovoid in shape and measures about 1/200 of an inch. This capsule is lined by a layer of flattened epithelial cells, which is also reflected over the surface of the glomerulus. During the periods of secretory activity the blood-vessels of the glomerulus become filled with blood, so that the cavity of the sac is almost obliterated; after secretory activity the blood-vessels contract and the sac-cavity becomes enlarged. In that portion of the tubule lying between the capsule and Henle's loop the epithelial cells are cuboid in shape; in Henle's loop they are flattened, while in the remainder of the tubule they are cuboid and columnar." (Brubaker's *Physiology.*)

PHYSIOLOGY.

1. The *manifestations of cell life* are: Movement, ingestion, assimilation, excretion, growth, irritability, and reproduction. *Metabolism* is the entire series of changes that occur in a cell or organism during the processes of nutrition. It is of two kinds: (1) Assimilative, or constructive (anabolism); and (2) destructive (katabolism).

2. Intestinal peristalsis is regulated by: (1) The vagus, which stimulates; and (2) branches of the sympathetic system, by the solar and lumbar plexuses, and the splanchnics; the effect of the sympathetic system is inhibition. (3) The rôle of the plexuses of Auerbach and Meissner is not known.

3. *Proteids* are converted into proteoses and peptones in the stomach, and in the small intestine (by the action of pepsin and trypsin, respectively).

Carbohydrates are converted (slightly) into dextrin and sugar in the mouth, by the action of the ptyalin of the saliva; also in the small intestine (by the action of amylopsin) into maltose.

Fats are emulsified and saponified in the small intestine by the action of steapsin. Bile also has some slight effect on starches and fat.

The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unite to form the portal vein, and (2) by the lymph vessels of the small intestine, which converge to empty into the thoracic duct. The water, inorganic salts, proteids, and sugar go by way of the portal vein to the ascending vena cava; the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

4. The patellar reflex is generally present in health. The afferent nerve is the anterior crural; the efferent nerve is also the anterior crural.

5. In the liver there is the blood in: (1) The *hepatic artery* (branch of celiac axis) which supplies Glisson's capsule, walls of the bile ducts, and in general serves for the nutrition of the organ. (2) The *hepatic vein*, which empties into the inferior vena cava; it arises in the liver, and takes the blood away from the liver. (3) The *portal vein*, which takes the absorbed products of digestion from the gastric, splenic, superior mesenteric, and inferior mesenteric veins to the liver.

6. *Boiling* breaks the starch grains, bursting the cellulose, and thus allowing the digestive juices to come more readily in contact with the granulose. The conversion of the starch into sugar takes place more rapidly.

A given amount of starch may be said to have been completely digested when no starch is left, it having all been converted into sugar. In the test tube this can be ascertained by the iodin test showing the absence of starch, and Fehling's test showing the presence of sugar.

7. The object of respiration is the interchange of gases in the lungs, so that oxygen may be introduced and carried to the tissues, and carbon dioxide may be expelled from the body. Two respiratory sounds are heard on listening to the chest, the inspiratory and expiratory. The respiratory center is located in the medulla.

8. *Three examples of value of knowledge of physiological chemistry:* (1) That albumin is coagulated by heat; (2) that glucose will reduce alkaline copper sulphate so-

lution; (3) that pepsin will only exert its proteolytic action in an acid medium.

9. The nerves concerned in a *vasomotor* action are: (1) The *vasoconstrictor*, which causes constriction of the blood-vessels and increase blood pressure; and (2) the *vaso-dilator*, which causes dilatation of the vessels by inhibiting the action of the vasoconstrictors, and lower blood pressure.

10. As the blood passes through the kidneys it loses: Water, salts, urea, carbon dioxide, and extractives.

CHEMISTRY AND TOXICOLOGY.

1. The *constituents of the atmosphere* are: Oxygen, nitrogen, carbon dioxide, water vapor, ammonia, argon, etc. Air is a mixture, and not a definite chemical compound. *Proof:* (1) The composition is not constant; (2) the proportion of its constituents bears no relation to their atomic weights; (3) when air is absorbed by water and then expelled, the ratio of the nitrogen and oxygen is not the same as in the original air; (4) when oxygen and nitrogen are brought together in proper proportions there is no chemical action, nor is heat given off or absorbed, and yet the resulting mixture has all the properties of air. Carbon dioxide is the food of vegetables, and is by them utilized for the building up of complex organic compounds. *Diffusion of gases:* If two gases be brought in contact with each other they will quickly mingle so as to make a uniform mixture. A similar diffusion will take place if they are separated by a porous membrane or partition. *Graham's law of diffusion* is: The velocity of diffusion of different gases is inversely proportional to the square roots of their densities.

2. $H_2S + CuSO_4 = CuS + H_2SO_4$
$H_2S + KHO = H_2O + KHS$
$CaCO_3 + 2HCl = CaCl_2 + CO_2 + H_2O$
$2NaHCO_3 + \text{heat} = Na_2CO_3 + CO_2 + H_2O$
$2CO + O_2 = 2CO_2$

3. An *atom of an element* is the smallest particle of that element which can enter or leave a chemical reaction. A *molecule of an element* is the smallest particle of that element which can exist free.

The formula weight of the molecule of a gas in grams occupies a volume of 22.4 liters. Thus O_2 represents 32 grams of oxygen, which will occupy 22.4 liters; and NH_3 represents 17 grams of ammonia, which will also occupy 22.4 liters.

4. *Characteristics of a good drinking water:* (1) It should be clear and limpid. Cloudy and muddy waters should be avoided. (2) It should be colorless. A greenish or yellowish color is usually due to vegetable or animal matter

in solution or to organisms. (3) It should be odorless; especially free from sulphuretted hydrogen or putrefactive animal matter. (4) It should not be too cold, but should have a temperature of from 46° F. to 60° F. (5) It should have an agreeable taste; neither flat, salty, nor sweetish. A certain amount of hardness and dissolved gases give a sparkling taste. It should contain from 25 to 50 c.c. of gases per liter, of which 8 to 10 per cent. is carbon dioxide and the rest oxygen and nitrogen. (6) It should be as free as possible from dissolved organic matter, especially of animal origin. (7) It should not contain too great an amount of hardness. A certain quantity of saline matter is necessary, however, to give it a good taste. It should not contain over three or four parts of chlorine in 100,000 parts of water.—(From Bartley's *Chemistry.*)

5. *Petroleum products:* Cymogene (used in ice machines); rhigolene (used to produce cold, and as an anesthetic); gasolene and petroleum ether (used for making "air gas"); naphtha (used as a solvent for fats and rubber); benzine (used for varnishes and paints); kerosene (used for illuminating purposes); lubricating oil (for lubricating machinery); paraffin (for making candles).

6. *Three aromatic hydrocarbons:* (1) Benzene C_6H_6; (2) Phenol, C_6H_5OH; (3) Salicylic acid, C_6H_4OH, COOH.

7. Compound proteids are composed of a single proteid united to some non-proteid body. The chief groups are: (*a*) *Hemoglobins*—decomposable into an albumin and a crystalline pigment or chromogen. (b) *Nucleoproteids*—yield nucleic acids and native albumins on decomposition. Nucleohiston, etc. (*c*) *Glycoproteids*—decomposable into a reducing substance and a native albumin. Mucin, mucoids, phosphoglycoproteids.

8. *Xanthin group of leucomaines:* Adenin, hypoxanthin, guanin, xanthin, heteroxanthin, paraxanthin, carnin, pseudoxanthin, spermin. *Creatinin group of leucomaines:* Creatin, creatinin, xanthrocreatinin, crusocreatinin, amphicreatinin.

9. Poison ivy. *Symptoms of poisoning:* "When applied to the skin it causes, after a few hours, an intense itching and burning, followed by swelling of the skin of the affected parts, with papular eruption or slight vesication, terminating after a few days in desquamation."

Treatment: "An alcoholic solution of lead acetate usually gives prompt relief. If itching is severe it may be combined with opium. Painting the parts with ichthyol is successful with many, as is the application of fluid extract of grindelia robusta. Weak alkaline solutions have given excellent results."—(Riley's *Toxicology.*)

The *active principle* is toxicodendrol.

10. *Symptoms of poisoning by strychnine:* A sense of suffocation, thirst, tetanic spasms, usually opisthotonos.

sometimes emprosthotonos, occasionally vomiting, contraction of the pupils during the spasms, and death, either by asphyxia during a paroxysm, or by exhaustion during a remission. The symptoms appear in from a few minutes to an hour after taking the poison, usually in less than twenty minutes; and death in from five minutes to six hours, usually within two hours. *Treatment:* "The convulsions are to be arrested or mitigated by bringing the patient under the influence of chloral or chloroform as rapidly as possible; the stomach is to be washed out, and the patient is to be kept as quiet as possible." (Witthaus' *Essentials of Chemistry.*)

PATHOLOGY.

1. *Determining causes of disease:* Traumatism, temperature (heat, cold, burns), electricity, environment, poisons autointoxication, food, parasites, and micro-organisms.

2. *Effect of overfeeding:* Indigestion, disturbed metabolism, increase of urea, increase of fat or glycogen, obesity, fatty infiltration or degeneration, gout, diabetes, anemia.

3. *Hemorrhage* is the escape of all the constituents of the blood from the heart or blood-vessels. *Forms:* According to the source of the flow, it may be *cardiac, arterial, venous,* or *capillary.* Arterial hemorrhages may be *primary* (occurring at the time of injury), *intermediate* or *reactionary* (occurring within twenty-four hours of the injury), and *secondary* (occurring later, even some days after the injury). *Petechiæ* are minute, circumscribed hemorrhages, generally subcutaneous; when larger, they are called *ecchymoses,* or *extravasation,* or *sugillation;* a *hematoma* is a collection of blood in a solid tissue.

4. *Fatty infiltration* consists in the deposition of fat from the circulation between the cells of which a tissue is composed. *Etiology:* Heredity, excessive nutrition, digestive disorders, lack of exercise, anemia, alcohol, diminished oxidation, high external temperature. *Seats:* Beneath skin and serous membranes, in the fasciæ, in areolar connective tissue, mesentery, omentum, liver, heart, and kidneys.

5. "The *phenomena of inflammation* are dilatation of the arterioles, capillaries, and small veins. At first the blood-current is quickened, then retardation occurs, and may progress to stasis and thrombosis. During this time exudation of plasma and white corpuscles from the small veins, and perhaps the capillaries, is going on. The fate of the white cell may be either to break up and set free prothrombin, or to act as food for connective-tissue cells, or to act as a phagocyte and be transformed into a pus corpuscle. Red corpuscles may be exuded and broken up, setting free their coloring matter. The prothrombin of the white cells unites with the calcium chloride of the

plasma, and forms thrombin, or fibrin ferment, which acts upon the fibrinogen of plasma to form fibrin. The *tissues* are thus invaded with numbers of leucocytes. In bacterial inflammation a varying portion of the tissues is killed by the toxins produced, and is either replaced by a mass of small round cells, or liquefied into pus. In the latter case it is surrounded by a ring of small round cells. The connective-tissue cells absorb the leucocytes, and new vessels are formed, thus constituting repair. In non-bacterial inflammation, exudation may separate layers of cells to a large extent and form blebs. In chronic inflammation the formation of new fibrous tissue is the chief part of the process."—(*Aids to Surgery.*)

6. OSTEOMA. *General appearance:* There are two forms, exostoses and osteoma proper. The former has its surface irregular and nodular, and has the consistency of bone. The latter is more rounded and lobulated. *Seats:* Bone, cartilage, connective tissue near the bones, serous membranes, and organs such as parotid gland and testicle. *Structure:* Osteoma resembles bone tissue, but cartilage is apt to be mixed with it. Softening and other secondary degenerative changes may occur, and other tumors are apt to be associated with it (chondroma, fibroma, and sarcoma).

7. GLIOMA. *Seats:* Brain, spinal cord, and retina. *Structure:* It consists of cells containing rounded or oval nuclei, with very little protoplasm, and fine protoplasmic extensions which interlace and form an intercellular reticulum, giving a granular appearance. The number of the cells and the density of the intercellular network vary. As a rule, the cells are larger than neuroglia cells, and sometimes they contain several nuclei. The tumor is generally quite vascular, and occasionally teleangiectatic vessels may be observed. *Nature:* It is benign, but dangerous, on account of pressure; growth is slow, but it may become sarcomatous.—(From Stengel's *Pathology.*)

8. Destruction of red blood cells is called: Hemocytolysis, or hemolysis. *Etiology:* It occurs in the liver; it may result from burns, also from infections and toxic agents (such as potassium chlorate); malaria, pneumonia, and other diseases may cause it.

9. ANEURYSM. *Etiology:* Atheroma, arteriosclerosis, increased blood pressure, severe labor, strains, nephritis, cardiac hypertrophy, alcohol, syphilis. *Pathology:* The sac is at first formed by one or more of the arterial coats, but afterward it may be formed only of the surrounding cellular tissue. The endothelial lining disappears, fibrin becomes deposited around the walls of the cavity.

10. In *chronic interstitial nephritis,* "the lesions are principally seen in the cortex; at first patches of cellular infil-

tration appear, then the intertubular connective tissue becomes increased and fibrous, with destruction of glomeruli and the corresponding tubules. The glomerular epithelium becomes swollen and desquamates, Bowman's capsules may be much thickened by concentrically arranged layers of nucleated fibrous tissue, and the Malpighian bodies in places may be converted into nodules of fibrous tissue, in others into cysts. The corresponding tubules undergo atrophy with disintegration of their epithelium; here and there multiplication, with convolution of the tubules, may be present, suggesting an adenomatous formation. There is everywhere an increase of the stroma, in the cortex and pyramids, between the tubules, and around the glomeruli and vessels, with pronounced round-celled infiltration or well-formed fibrous tissue, in which calcification may occur. The vessel walls are thickened, chiefly owing to an endarteritis. Lardaceous infiltration may accompany the interstitial nephritis."—(Hewlett's *Pathology.*)

"The *urine* is increased in quantity, light yellow, clear, with a persistently low specific gravity. Albumin is scanty, occurring in traces, and is sometimes absent. A few narrow hyaline casts are almost constantly found in the very small deposit. Cellular elements are as a rule no more abundant than in normal urine. Polyuria, persistent low specific gravity, and the presence of a few hyaline casts constitute the urinary signs of this disease. Albumin may or may not be present in small quantity."—(Butler's *Diagnostics of Internal Medicine.)*

BACTERIOLOGY.

1. *Bacillus typhosus* is a rod-shaped organism, with rounded ends, is from 2 to 4 microns in length, and about three-fourths of a micron in breadth; it does not stain by Gram's method, but stains with all the anilin dyes; it has flagella, no spores, is aërobic and facultative anaërobic, and is motile.

To distinguish the typhoid bacillus from the colon bacillus: (1) On gelatin plates, the colonies of typhoid develop more slowly than those of colon bacillus. (2) The colon bacillus causes fermentation with production of gas in media which contain sugar; the typhoid bacillus does not. (3) The colon bacillus produces a strong acid reaction and coagulates milk within twenty-four to forty-eight hours; the typhoid bacillus does not coagulate milk. (4) In peptone solution the colon bacillus produces indol; the typhoid bacillus does not. (5) The typhoid bacillus gives the Widal reaction with typhoid serum; the colon bacillus does not.

2. The cause of syphilis is the *treponema pallidum.* It is a very slender spiral, about 4 to 20 microns in length, with very close and regular turns, the curves vary in number from three or four to twelve or twenty. At each

pole is a fine flagellum. It can move forward and backward, and also rotate on its axis. It is not settled whether division is transverse or longitudinal. It has not yet been cultivated on artificial media.

3. *Immunity* is the power of resistance of cells and tissues to the action of pathogenic bacteria. Immunity may be either natural or acquired.

Natural immunity is this power of resistance, natural and inherited, and peculiar to certain groups of animals, but common to every individual of these groups.

Acquired immunity is this resistance acquired: (1) By a previous attack of the disease caused by the bacteria, or (2) by the person being made artificially insusceptible. The conditions which give immunity from the pathogenic action of bacteria are: (1) A previous attack of the disease; (2) inoculation, with small quantities of bacteria, so as to produce a mild attack of the disease; (3) vaccination; (4) the introduction of antitoxins; (5) the introduction of the toxins of the bacteria.

Active immunity follows an attack of a certain disease and secures immunity for that alone; or it follows inoculation of a virus weaker than necessary to cause the typical disease; or it follows inoculation by bacterial products apart from the organisms themselves.

Passive immunity is the term applied to the effect of a serum derived from an immunized animal and injected into one not immune.

4. Bacteria multiply by fission. A bacterium about to divide seems to be larger than normal, and if it is a coccus it becomes more ovoid; changes occur first in the nucleus, and the bacterium just falls in two. It has been calculated that a single bacterium could, by fission, produce two in one hour. Fortunately, they seldom obtain food enough to keep up this process for any length of time.

Spore formation is not so much a method of multiplication as of continuance of the life of the individual bacterial cell; it is a process by which the organism enters a stage in which it can better resist certain deleterious influences, such as high temperature, desiccation, lack of nutrition. It occurs chiefly in bacilli. There are two forms: *Endospores* and *arthrospores*. The former are true spores.

5. *Bacterial enzymes* are enzymes or ferments produced by bacteria, and which cause certain of the chemical effects supposed to be due to the bacteria. The curdling of milk is due to a bacterial enzyme rather than to a microorganism directly.

PRACTICE OF MEDICINE.

1. *Scarlet fever.* Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours.

Character of eruption, a scarlet punctate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker; the tongue is of the "strawberry" type; the lymphatics in the neck may be swollen, and there is sore throat.

2. *Whooping cough.* A highly contagious disease, characterized by inflammation of the respiratory tract, associated with a peculiar spasmodic cough ending in a whooping inspiration. The incubation period is from 4 to 14 days, and is followed by a stage in which catarrhal symptoms, loss of appetite, fever, and restlessness are present. The paroxysms begin about the second week, and consist of a number of short, spasmodic, expiratory coughs, succeeded by a long-drawn inspiration and a peculiar whoop, often terminating in vomiting. The eyes are suffused and the under lids are swollen and pinkish in color. The number of paroxysms may be very great, and this stage lasts from 3 to 4 weeks or longer. The symptoms then gradually ameliorate, and the stage of decline lasts 2 or 3 weeks longer. Convulsions, vomiting, bronchitis, and bronchopneumonia may complicate the affection. The outlook is favorable in uncomplicated cases. *The treatment* consists in isolation, proper feeding, protection from drafts, and the administration of atropin, belladonna, and antipyrin. Bromoform may be given to quiet the cough. During convalescence cod-liver oil, syrup of the iodide of iron, syrup of hydriodic acid, etc., should be administered. *(Pocket Cyclopedia.)*

3. *Pericarditis* is a disease usually occurring in the course of acute rheumatism, chorea, or septicemia; it is also occasionally seen in influenza, pneumonia, Bright's disease, and some other conditions. It bears the same relation to the heart as pleurisy does to the lungs, and, like pleurisy, may be "dry" or accompanied by an effusion of fluid into the pericardial sac, either serous or purulent in character. *The symptoms* are pain and tenderness over the heart region, pyrexia, increased pulse rate, and dyspnea. A "friction sound" can be heard. After a few days fluid is poured out into the pericardium, and the action of the heart may be seriously impeded. In the large majority of cases the effusion is fairly rapidly absorbed if the patient is carefully treated; but in some the heart's action becomes more and more embarrassed, the pulse becomes more rapid, weak, and irregular, and ultimately fails altogether. In the cases which recover the heart often remains permanently weakened, owing to adhesions forming between the layers of the pericardium. *In the treatment* of pericarditis the first essential is absolute rest in bed,

light, easily digested food, and complete quiet. Leeches are often applied for the relief of pain, and sometimes opium or morphine may be necessary. Paracentesis pericardii may be necessary.

4. "If possible, the patient should be under observation for a day before operation. The heart, lungs, and kidneys should be examined. A purgative should be given the night before, and an enema, the morning of the operation. Hot broth or beef tea is given for breakfast on the morning of the operation. The patient is placed in the recumbent posture, with the clothing loosened about the neck, and all articles, including artificial teeth, removed from the mouth. The bladder should be emptied just before the anesthetic is given. Oxygen, stimulants, a hypodermic syringe, a mouth gag, and tongue forceps should be at hand. Ether is best administered by Allis' inhaler, by dropping it on gauze, or in a towel cone. Attention should be paid to the condition of the pulse, skin, pupil, and the reflexes. Shock is lessened by keeping the patient warm during and after the operation. In administering chloroform, vaselin should first be smeared upon the face of the patient. It is best given drop by drop, upon several layers of gauze, just as the patient inspires. The chloroform vapor should never exceed 4% of the air used. Strict attention should be paid to the color of the skin, the action of the heart, the pupils, and the respiration."—(*Pocket Cyclopedia.*)

5. *Gastric ulcer* is generally caused by injury or bacteria, is most apt to occur between the ages of twenty and forty-five; after eating there is pain localized in the stomach, vomiting occurs soon after eating, hematemesis is common, there is localized tenderness over the stomach, and examination of the gastric contents shows an excess of free HCl.

Gastric carcinoma does not usually occur before forty years of age, is more common in males, the pain is localized and constant, vomiting is copious and occurs some time after eating; the vomitus contains "coffee ground" material; hemorrhages are common; a tumor may be palpated, and examination of the gastric contents shows absence of free HCl and presence of lactic acid; severe anemia and cachexia are also present.

In *duodenal ulcer* the pain is apt to be more to the right, and to occur at an interval of two or three hours after meals; the hemorrhages will be intestinal, and the blood will be passed by way of the bowels, and not vomited. In many cases the symptoms are identical with those of gastric ulcer.

6. *The treatment of lobar pneumonia* "consists in rest in bed, milk diet, and the administration of fractional doses

of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice-bags or compresses wrung out of cold water (60°-70° F.) to the chest or by the use of the warm or cold wet-pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dyspnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease." *(Pocket Cyclopedia.)*

7. The patient should be put in the best possible physical condition. Proper climate and dwelling place, with sunshine, ventilation, nutritious and easily digested food, mild exercise, proper hygiene, are all indicated. The company of consumptives should be avoided. Tonics may be necessary.

8. ***Drugs which lower blood pressure:*** Amyl nitrite, sodium nitrite, spirit of nitrous ether, nitroglycerin. They act by producing dilatation of the blood-vessels.

9. *The treatment of acute cystitis* consists of rest in bed, liquid diet, saline purgation, the application of leeches to the perineum and poultices over the pubes, the administration of plenty of water, and the use of the citrate or acetate of potassium in gr. 15 doses, or spirit of nitrous ether, 3i. every 2 hours. Pain may be relieved by ice-water injections into the rectum, injections of cocain into the bladder, and by opium suppositories. *(Pocket Cyclopedia.)*

10. ***Complications which may follow typhoid fever:*** Relapses, indigestion, constipation, diarrhea, perforation of intestine, peritonitis, hepatic abscess, cholecystitis, gallstones, hypertrophy of spleen, paralysis, typhoid spine, neuritis.

OBSTETRICS.

1. *Hour-glass contraction* is a narrowing in the uterus just above the internal os; the lower uterine segment and cervix are flabby and widen from above downward to the vaginal insertion. The placenta must be removed manually, after an anesthetic has been given.

2. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Treatment:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists

of dilatation of cervix, version, and immediate extraction of the child.

3. If the chin is presenting anteriorly, expectant treatment may suffice; but care must be taken to observe that the chin does not rotate backward. Spontaneous version may occur, and the presentation becomes a vertex one. Failing this, or as a means of favoring this, postural treatment, such as Walcher's position, has been recommended. If, in spite of this, engagement has not occurred, cephalic version is indicated, care being taken not to rupture the membranes. If this is not successful, podalic version should be tried. If, after all these manipulations the child is still alive and the head is engaged, symphyseotomy is indicated; if the child is dead, craniotomy should be performed.

4. PUERPERAL ECLAMPSIA. The *causes* may be: Uremia, albuminuria, imperfect elimination of carbon dioxide by the lungs, medicinal poisons, septic infection; predisposing causes are renal disease, and imperfect elimination of the skin, bowels, and kidneys. The line of *treatment* laid down by Edgar is as follows: For *preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. The *curative treatment includes:* (1) Controlling the convulsions (by chloroform, veratrum, or chloral); (2) elimination of the poison or poisons which are presumed to cause the convulsions; (3) emptying the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

5. In *shoulder* cases (as distinguished from *vertex*) the tumor is unsymmetrical in shape, and is longer transversely or obliquely; the head can be felt in one iliac fossa, and the breech higher up in the flank of the opposite side.

In cases of *shoulder presentation,* if seen before labor, version should be performed to correct the malpresentation; in case of impaction a cesarean section is indicated; sometimes decapitation or embryotomy has been performed, but a cesarean section is preferable. Cases of shoulder presentation have been known to terminate spontaneously, but it is not advisable to rely on this possibility.

GYNECOLOGY.

1. *The virgin uterus* is about three inches long, about two inches wide at the upper part, and about one inch

thick; it weighs about an ounce, or an ounce and a half. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine and rectouterine. It is pear-shaped; its cavity is very small; it is divided into fundus and cervix; besides the opening at the os there is an opening on each side near the fundus leading into a Fallopian tube; it is lined by mucous membrane, and covered by serous membrane. The nerves are from the hypogastric and sacral plexus, and from 3d and 4th sacral nerves.

2. The *vulvovaginal glands* are small bodies, size of a bean, situated one in each side of the posterior part of the commencement of the vagina. Each gland opens by means of a duct immediately external to the hymen.

3. CAUSES OF DOWNWARD DISPLACEMENTS OF THE UTERUS: (1) *Pressure from above* (pelvic or abdominal tumors ascites, tight or heavy clothing, straining at stool, musculat exertion, fecal accumulations, habitual overdistention of the bladder); (2) *weakening and relaxation of the uterine supports* (subinvolution, senile atrophy of pelvic floor, abnormally large pelvis, increased weight of uterus, puerperal traumatisms, pressure from above, traction from below); (3) *increased weight of uterus* (congestion, subinvolution, metritis, pregnancy, fluid in the endometrium, uterine tumors); (4) *traction from below* (vaginal cicatrices, falling of pelvic floor, contraction and congenital shortening of vagina, tumors of cervix or vagina).—(From Dudley's *Gynecology.*)

4. In tuberculosis of the pelvis the organ most frequently affected is the Fallopian tube.

5. "When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility; nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy; pains are often very severe, with marked tenderness within the pelvis; such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating; this tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two

fists. (4) The os uteri is patulous; the uterus is displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua in part or whole Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs."—(American Text-Book of Obstetrics.)*

SURGERY.

1. Clamp and cautery. *Radical treatment* is advisable when there is much pain and bleeding. It must be ascertained first that the piles are not due to disease elsewhere, as cirrhosis or stricture, or to pregnancy. The bowels are emptied, and the patient is placed in the lithotomy position. The sphincter is then dilated with two thumbs, to expose the piles, which are caught up with ring forceps. A clamp is applied to the piles in turn, and they are removed by the cautery. The bowels are kept confined for five or six days, when castor-oil is given. Very little pain and no bleeding follow this operation.—(*Aids to Surgery.*)

2. Reduce the dislocation, then maintain the proper position by a figure-of-eight bandage about both shoulders, the turns crossing in front of the chest, or put a plaster of Paris dressing about the shoulder and chest. Prolonged retention and immobilization are necessary.

3. *Always present:* Disability, pain.

Usually present: History of injury, crepitus, point of false motion, deformity.

4. *Treatment:* The hole in the bone must be enlarged, and all depressed pieces, foreign bodies, and blood-clot removed. In the case of bullets, if not found after a very limited search, they must be left alone. Protruding brain substance is better removed, and an endeavor must be made to sterilize the wound by liberally washing it with antiseptics. The dura mater should be sutured, but with a drain-tube left in for twenty-four hours. If sepsis occurs, a very free opening is necessary to prevent spreading if the inflammation and general meningitis. *(Aids to Surgery.)*

5. "A curved transverse incision, with the concavity upward, is made over the tumor from the outer border of one sternomastoid to beyond the middle line, the skin and platysma divided, the ribbon muscles separated in the median line or divided transversely, and the fibrous capsule opened. All bleeding is checked, the lobe dislocated from its fibrous envelope, the superior thyroid vessels divided between two ligatures, and the inferior thyroid vessels tied close to the gland in order to avoid the recurrent laryngeal nerve. The thyroidea ima if present also is tied. The

isthmus of the gland is crushed with strong forceps and ligated in sections, or it may be divided and the bleeding controlled by sutures. Any attachments to the cricoid are separated, or perhaps better, a thin slice of the gland is left in place in this situation to avoid injury to the recurrent laryngeal nerve. The wound is irrigated with salt solution, and closed after suturing the divided muscles, a small space being left for gauze drainage for twenty-four hours. The normal anatomy is necessarily disturbed in large growths; thus the jugular vein, which has branches coming from the tumor, moves forward with the growth, while the artery, which has no such connections, is pushed backward and outward and may lie external to the vein. The tracheal rings may be absorbed or softened, hence more easily injured; in some cases the trachea collapses as soon as the support of the tumor is removed, the patient dying of asphyxia unless a tube is inserted. Sudden death may occur also from reflex inhibition of the heart, the status lymphaticus, or from the absorption of thyroid secretion from the wound.—(Stewart's *Surgery*.)

6. ***Indications for resection of bowel:*** Strictures of intestine, gangrene of intestine, extensive injury of intestine, tumors of intestine, tuberculosis of intestine, injury to the vessels supplying intestines, some cases of intussusception, and artificial anus.

7. *General anesthesia* is general (surgical) insensibility accompanied by loss of consciousness. It is produced by the inhalation of ether, chloroform or nitrous oxide; or a mixture or sequence of these. *Dangers to be avoided:* Giving too much or too little; failure of respiration; failure of heart beat; chilling of the patient.

Signs of importance during anesthesia. Breathing.—Snoring is an assuring sound, but the stertor produced by a partial closure of the glottis is ominous, and the moment it is heard the jaw must be brought more forcibly forward; if it does not cease then, the anesthetic must be discontinued until the condition is corrected.

The Pulse.—At the beginning of anesthesia the pulse will often be very rapid, due to the excitement of the patient, but as soon as unconsciousness is complete it usually becomes much slower.

The Pupils.—On beginning the anesthetic the pupils dilate, then contract until normal or a little smaller, and usually remain contracted during the maintenance of safe anesthesia. If they are dilated and respond to light, it indicates that the anesthetic is not profound; if dilated and they do not respond to light, it indicates that the anesthetic has been pushed to a dangerous extent and it must be instantly stopped. The variation of the pupils

in different individuals is so great that too much must not be risked on their appearance.

Color of the Face and Lips.—If the face becomes blue, it shows that the patient is not getting enough air, and the inhaler must be removed at once. A patient with bright-red lips or rosy cheeks is not in any immediate danger from the anesthetic. *(Pocket Cyclopedia.)*

8. INDICATIONS FOR LIGATURE OF COMMON CAROTID: Wounds of either common carotid, external carotid, or internal carotid (and branches of the two latter); in aneurysms; to limit the growth of inoperable tumors; as a temporary procedure. The *line of the artery* is from the sternoclavicular articulation to midway between the angle of the jaw and the tip of the mastoid, the vessel bifurcating at the upper border of the thyroid cartilage. A sand pillow is placed beneath the neck, the head turned toward the opposite side, and the chin raised. A three-inch incision, the center of which is on a level with the cricoid cartilage, is made along the arterial line, severing the skin, and both layers of the superficial fascia, between which lies the platysma, and exposing the anterior edge of the sternomastoid, which is the *muscular guide* to the artery. After cutting the deep fascia which is attached to the border of the sternomastoid, this muscle is retraced outwards, and the omohyoid exposed and drawn downward. The sheath of the vessel is now identified by means of the *descendens noni nerve,* which descends upon it, and opened on the inner side to avoid the internal jugular vein, which lies to the outer side in a separate compartment. The pneumogastric nerve lies behind and between the artery and vein in a separate compartment of the same sheath. The needle is passed from without inward.

9. *Shock* is the name given to a sudden and general depression of the vital powers, due to some strong stimulation (such as injury or emotion) acting on the vital centers in the medulla, and producing vasomotor paralysis. *Treatment:* Place the patient in the recumbent position, with the head low; apply warmth to the body; administer a stimulant, and give a hot saline infusion; morphine, hypodermatically, may be necessary for the relief of pain.

10. *Appendicostomy* is performed to irrigate the colon in cases of chronic ulcerative colitis or chronic dysentery, and in chronic constipation.

The appendix is brought out through a small wound over the cecum, and, after it has been fixed with sutures, the terminal portion is amputated. A rubber catheter is inserted and retained in the appendix so long as the treatment by irrigation is called for. When the treatment is completed the fistula is closed by resecting the stump of the appendix.

HYGIENE.

1. *Disinfectants* are agents which restrain infectious diseases by destroying or removing their specific poisons; some are germicides, as chlorine; others act by dilution or removal, as soap and water, and fresh air. *Germicides* are agents which destroy bacteria and their germs.

2. The following disease-carrying bacilli may be conveyed by milk: Tubercle bacillus, Klebs-Loeffler bacillus of diphtheria, typhoid bacillus, cholera bacillus.

The *tubercle bacillus* is rod shaped, is from 1½ to 3½ microns in length, and about one-third to one-half a micron in breadth, is a strict parasite, is not motile, and has no flagella. It is slightly curved, does not form spores, is not liquefying, is aërobic and nonchromogenic; it resists acids; it grows well on blood serum; stains well by Ehrlich's, Ziehl-Nielsen's, or Gabbett's method; it is Gram-positive.

The *bacillus of diphtheria* is from 2 to 6 microns in length and from 0.2 to 1.0 micron in breadth; is slightly curved, and often has clubbed and rounded ends; occurs either singly or in pairs, or in irregular groups, but does not form chains; it has no flagella, is nonmotile, and aërobic; is noted for its pleomorphism; it does not stain uniformly, but stains well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue.

The *typhoid bacillus* is a rod-shaped organism, with rounded ends, is from 2 to 4 microns in length, and about three-fourths of a micron in breadth; it does not stain by Gram's method, but stains with all the anilin dyes; it has flagella, no spores, is aërobic and facultative anaërobic, and is motile.

The *cholera bacillus* is a spirillum, actively motile, and with a flagellum at one end; it is curved, has rounded ends, and is about half the length of the tubercle bacillus; it stains readily with ordinary anilin stains, but not by Gram's method; it is easily cultivated on the usual media; it has but slight power of resistance; it liquefies gelatin, and does not produce pigment.

3. Burning is the best disinfectant; then moist heat and dry heat; carbolic acid and mercury bichloride are excellent except in the presence of albuminous material, when chloride of lime or formalin are better; formaldehyde and sulphur dioxide are both good disinfectants.

4. Carbon dioxide; crowd poison; volatile matters from foul mouths, decayed teeth, and the digestive tract; aqueous vapor from the respiration and skin; products of combustion of illuminating substances.

5. *Five quarantinable diseases:* Scarlet fever, about 10 days; diphtheria, about 12 days; measles, about 16 days; chicken pox, about 20 days; mumps, about three weeks.

EYE, EAR, NOSE, AND THROAT.

1. *For chemical burns of the eyeball:* The treatment consists in the complete removal of the caustic substance as soon as possible. Solid particles are removed with cotton or forceps. Then the conjunctival sac is washed out with solutions which tend to neutralize the corrosive substance or render it insoluble. In the case of lime, mortar, or caustic alkalies, we flush out with a solution of boric acid; or we may wash out the eye with oil. If the corrosive agent consisted of an acid, the eye is irrigated with a weak solution of sodium bicarbonate. Subsequently we use cold compresses, atropine, and sometimes a bandage. After the loosening of the eschars, we must separate the adhesions frequently. Symblepharon often occurs notwithstanding the greatest care.—(May's *Diseases of the Eye.*)

2. *Tracheotomy is indicated* in diphtheria when intubation does not relieve and the symptoms are urgent; to remove foreign bodies from the larynx that cannot be treated by simple methods; to provide passage for air, in growths, tumors, or abscesses pressing on the larynx and interfering with the proper supply of air; and for edema of the glottis when the intubation tube cannot be introduced.

Intubation is indicated in any obstruction of the larynx which prevents a sufficient amount of air from entering the lungs, such as croup, edema of the glottis, spasm of the larynx, any form of paralysis that lessens the lumen of the larynx, chronic stenosis. *Intubation is not indicated* for the removal of a foreign body, nor for any obstruction too far down to be reached by the shaft of the tube.

3. *Chronic purulent otitis media* is due to the permanent lodgment of staphylococci in the acutely inflamed middle ear. This unfortunate result is usually brought about by improper—*i. e.*, excessive—treatment of acute otitis media, generally by the patient, but sometimes, regrettably, by the physician. *The symptoms* are a more or less copious and offensive discharge from the ear and a perforated membrana tympani. The perforation varies in size, and the ossicles may be more or less necrosed. Impairment of hearing, tinnitus, vertigo, attacks of so-called "gatherings in the ear," and earache are present. *Treatment:* Cotton must never be worn in the discharging ear. The discharge must be mopped out, but if very thick and copious, syringing by means of sterile water or sterile water containing salt (gr. 5-℥i) or carbolic acid (1:40), once or twice in 24 hours in bad cases, is permissible. After mopping the ear, 10 drops of an antiseptic solution may be instilled. Formalin solution (1:1000-1:2000), carbolic acid solution (1:40), or, if granulations are present, absolute alcohol, may be dropped in and allowed to remain for a few min-

utes, and then turned out into a towel. This treatment should be continued once or twice a day in very bad cases, and less often when the discharge decreases. If, after several months there is no improvement, the ossicles should be removed.—(*Pocket Cyclopedia.*)

4. In *conjunctivitis* there are no granules with subsequent cicatricial changes.

Trachoma is an inflammatory condition of the conjunctiva, accompanied by hypertrophy, granule formation, and subsequent cicatricial changes.

Treatment "consists in an attempt to reduce the inflammatory symptoms and secretion, and to check and remove hypertrophy of the conjunctiva, thus shortening the duration and diminishing the liability to conjunctival cicatrization and to sequelæ. This is accomplished either by the use of certain irritating applications, or by mechanical (surgical) means. *Irritating applications:* Sulphate of copper in the form of a crystal or pencil is the favorite local application. Nitrate of silver (1 or 2 per cent. solution), glycerole of tannin (5 to 25 per cent.), and the alum stick are also employed. *Mechanical (surgical) treatment* includes expression, grattage, excision, curetting, electrolysis, *x*-rays, and galvano-cautery."—(May's *Diseases of the Eye.*)

Prognosis is not favorable; the condition may last for years, and complete recovery is not common.

5. The bridge of the nose may be depressed, or the middle turbinated bone may be diseased as the result of syphilis.

Syphilitic affections of the pharynx are met with in the secondary stage as mucous patches and snail-track ulcers; in the tertiary stage as gummatous infiltration, which soon breaks down and forms typical ulceration. The ulcers soon heal under treatment by mercury and iodide of potassium, but the cicatrization may lead to adhesion of the velum to the posterior pharyngeal wall; or pharyngeal stenosis, which may require division and regular dilatation with bougies.—(*Aids to Surgery.*)

MEDICAL JURISPRUDENCE.

1. *Medical jurisprudence* is the application of the knowledge of any of the branches of medicine to the problems and requirements of the law.

In *expert testimony* the witness may give his *opinion* on facts or supposed facts as noted by himself or asserted by others. *Theoretically* this can be done only by those perfectly familiar with the subject in question; but *practically* any (or almost any) physician with a license to practise is accepted as an expert witness.

In *ordinary* testimony the witness testifies only to *facts*

which he has seen, or heard, or with which he has become acquainted by personal observation.

Malpractice is a failure on the part of a medical practitioner to use such skill, care, and judgment in the treatment of a patient as the law requires; and thereby the patient suffers damage. If due to negligence only, it is *civil* malpractice. But if done deliberately, or wrongfully, or if gross carelessness or neglect have been shown, or if some illegal operation (such as criminal abortion) be performed, it is *criminal malpractice.*

2. In *death by asphyxia:* Very commonly punctate ecchymoses are visible on the conjunctiva, face, neck, and chest. They are considered by Tardieu to be more frequent in strangulation than in asphyxia from other causes, or than in cases of overstraining, which likewise may lead to them. In the subcutaneous cellular tissue, and in the fascia of the muscles above and below the hyoid bone extravasations are frequently found, as well as on the external surface of the thyroid cartilage and trachea. The lungs vary as regards their vascularity; but on the surface it is common to find pseudomembranous patches, which are due to the rupture of some of the superficial air cells and collection of air bubbles under the pleura. In the substance of the lungs congested patches, or apoplectic extravasations, are often found, varying in size, but larger than those usually found in suffocation.

In *death by drowning:* The surface is pallid, the face appears tranquil, the eyes and mouth being partly open. The skin often has the appearance known as gooseskin. and, if the body has lain upwards of twelve hours in the water, that of the hands and the feet is sodden by imbibition. The most important external sign is the presence on the mouth and nostrils of a fine froth (possibly blood stained), composed of air, mucus, and the medium in which drowning took place; if the body remains three or four days in water, the froth disappears. Exceptionally. fragments of weeds or other small objects may be found tightly grasped in the hands. On opening the thorax the lungs, gray in color, with reddish staining, are seen to be very voluminous, a condition known as ballooning, partly due to infiltration of the lung tissue with some of the medium in which drowning took place, and partly to true edema. The lung substance is inelastic and pits on pressure. On section, fluid and froth resembling that found on the lips exude from the divided air passages. Minute subpleural hemorrhages are not infrequently present, and the pleural cavities may contain fluid. The stomach often contains water or other liquid which was involuntarily swallowed during attempts at respiration. Occasionally some of this fluid is forced by vital action into the intes-

tines. With one exception, the remaining appearances are those met with after death from asphyxia. The exception is constituted by the blood, which is not only dark colored and fluid, as is usual after death from asphyxia, but is also diluted by the imbibition of water from the stomach and lungs.

In *death by strangulation:* The blood is of a dark color, owing to complete reduction of the hemoglobin. The proportion of carbonic acid is increased, and owing to its excess the blood coagulates slowly or imperfectly; hence it remains fluid or forms few and soft coagula. The large veins, the pulmonary artery, and the cavities of the right side of the heart may be distended with dark fluid blood, but this is by no means necessarily the case. The left side is usually empty or nearly so. The lungs may be congested, but are often pallid and anemic, though the dependent parts usually exhibit appearances of hypostatic engorgement. The abdominal viscera, especially the kidneys, are often congested. The appearance of the brain varies; it may be anemic or more or less congested. Special signs characterize special modes of causation of asphyxia.—(From Quain's *Dictionary of Medicine.*)

3. The physician should note the body; and the surroundings, conditions, and circumstances under which it is found. If the body is in a building, he should observe the position and arrangement of furniture, etc., blood, position of body, arrangement of clothes, position and character of weapons, footprints, and finger marks. The body should be examined for signs of violence (wounds, bruises, blood spots); lividities; the presence of rigor mortis, etc. The physician should keep his suspicions to himself, hear all he can, observe all he can, say nothing, and communicate with the coroner or medical examiner.

4. A *wound inflicted during life* is generally characterized by hemorrhage, coagulation of the blood, eversion of the edges, and retraction of its sides. It may also be inferred that the wound was inflicted during life if any of the following are noticed: The presence of inflammation. swelling, pus, or gangrene on the edges of the wound, or if there is any sign of beginning cicatrization.

In *burns* produced *before death:* There is usually a blister, with a bright, red base, and containing a serous fluid, which is albuminous; occasionally there will be no blister if there has been excessive shock; also, there will be a red line of demarcation between the injured and the uninjured parts, and this, being a vital process, is only developed during life. In *burns* produced *after death* there is no true blister, no red base, and gas only is present in place of the serous fluid.

5. According to Taylor, the term insanity is applied to

those states of disordered mind in which a person loses the power of regulating his actions and conduct according to the ordinary rules of society. In all cases of real insanity the intellect is more or less affected.

Intellectual insanity refers to those forms which are characterized by hallucinations and delusions, but in which the patient knows right from wrong.

Moral insanity refers to that condition in which the moral perceptions are blunted, and the patient cannot judge a question of right and wrong. As a rule, moral insanity is accompanied with some intellectual disturbance.

STATE BOARD EXAMINATION QUESTIONS.

STATE OF MISSISSIPPI.

ANATOMY.

1. Explain bone development and give examples.
2. Describe hip joint, naming its ligaments.
3. Give origin, course, and distribution of third cranial nerve.
4. Name the preaxial muscles, giving the insertion of any one of them.
5. What constitutes the lymphatic system, and how connected?
6. Locate the emissary veins and give clinical importance.
7. Name abdominal viscera wholly covered by peritoneum.
8. Give nerve and blood supply of the rectum.

PHYSIOLOGY.

1. Describe the sounds of the heart and give causes.
2. Describe and give function of the Haversian canal.
3. Discuss (*a*) emulsification and (*b*) saponification.
4. Discuss fully rigor mortis.
5. Discuss minutely the excretion of urine.
6. Give the secretions of the alimentary canal, give the reaction and active principles of each one.
7. Discuss, fully, respiration.
8. Give function of adipose tissues.

CHEMISTRY.

1. Give the chemical formulæ of the following substances: (*a*) Iron sulphate, (*b*) hydrocyanic acid, (*c*) corrosive sublimate, (*d*) zinc sulphate.
2. What test would you use or employ to determine the presence of organic matter in drinking water?
3. In what combination is phosphorus found in nature?
4. Give antidote for corrosive sublimate, and explain its action.

5. Give the name and general physical and chemical properties of the halogens.

6. What physical actions have a tendency to decompose compound substances?

7. Name four chief elements entering into the formation of organic compounds.

8. In testing urine for sugar explain the reaction where Haines' solution is used.

MATERIA MEDICA.

1. Give source and uses in medicine of ichthyol.

2. Give the official name, composition, and usual dose of Fowler's solution and Donovan's solution.

3. Name the two alkaloids of opium usually used, and give doses. Also name and give doses of two derivatives of morphine.

4. What active principles are found in digitalis? Name the official preparations and doses; and say in what conditions digitalis is contraindicated.

5. Give hypodermic doses of the following: Strychnine sulphate, atropine sulphate, nitroglycerin, physostigmine; and compare the therapeutic uses of atropine with nitroglycerin.

6. Give the common name, therapeutic uses, and dose of sodium sulphate.

7. Name the principal alkaloid and official preparations of aconite, and state their doses, and give physiological action, and name conditions that contraindicate the use of aconite. Name antidotes.

8. Give source, dose, and indications for salol, and name the drugs it is subdivided into after administration.

PATHOLOGY.

1. What conditions might cause cyanosis of the face, jugular pulsation, and general anasarca?

2. What is the pathology of suppurative inflammation, and of plastic inflammation?

3. What is the pathology of a decayed tooth (physiological)?

4. What is the gross pathology of arthritis deformans?

5. Give pathological characteristics of medullary type of carcinoma of the breast.

6. Enumerate the pathological sequences of diphtheria.

7. Give gross pathology of endocarditis and mention most frequent causes.

8. Describe step by step the process involved in simple inflammation.

MISSISSIPPI.

SURGERY.

1. Name all the agents employed for the production of general and local anesthesia, and give treatment for overdose of each.
2. Name in order of their virulence the bacteria of suppuration.
3. Name all the conditions requiring trephining, and describe the operation.
4. Give symptoms and treatment of psoas abscess.
5. Describe an osteoclast, and give indications for its use.
6. Give a clear description of a perineal prostatectomy.
7. Give cause and treatment of esophageal stricture.
8. Describe paracentesis tympani, and give indications for the procedure.

OBSTETRICS.

1. Describe methods to determine position of the fetus previous to labor.
2. State the danger to the cord in the various stages of labor and describe the methods of overcoming these dangers.
3. For what conditions and at what periods of time should cesarean section be performed?
4. Name four causes of dystocia with treatment of any one form.
5. Describe delivery in a case of breech presentation requiring the application of forceps.
6. Define involution and subinvolution.
7. What are after-pains? State their cause and give treatment.
8. Name the fetal evelopes from without inward.

HYGIENE.

1. What are the reasons for abolishing the common drinking cup?
2. Name and describe three intestinal parasites, and how would you prevent infection by each?
3. What hygienic instructions should be given to patients with tuberculosis?
4. What are the principal adulterations of milk?
5. Describe in detail the methods of transmission of yellow fever and malarial fever.
6. Give period of incubation, time for quarantining and mode of disinfecting after five diseases.
7. When should persons who have been infected with gonorrhea or syphilis be permitted to marry?
8. Differentiate between endemic and epidemic diseases.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE OF MISSISSIPPI.

ANATOMY.

1. *Development of bone.* "Bone is formed by the deposition of lime salts either in cartilage or in membrane. The bones of the limbs, vertebral column, sternum, ribs, base of skull are formed from cartilage; the roof of the skull, the bones of the face, the lower jaw except the angle, are formed from membrane identical with the future periosteum. Bone *grows in length* by intracartilaginous and *in thickness* by intramembranous ossification.

Intracartilaginous ossification.—In a long bone ossification begins in the center of the bone, both in the cartilage and periosteum; later on, mostly after birth, other centers appear, which form the epiphysis, and finally these join the shaft. The processes by which bone succeeds cartilage may be stated as follows: (1) According to Klein, the cartilage at the center of ossification becomes permeated with channels, containing vessels and osteoblasts derived from the inner layer of the periosteum. (2) In the neighborhood of the vessels the cells become enlarged, undergo division, and are arranged in radiating columns. (3) The matrix between the columns of cells becomes permeated with lime salts, extending between and around cell groups, enclosing them in spaces called the primary areolæ, in which osteoblasts, marrow cells, and vessels replace the cartilage cells. (4) The osteblasts arrange themselves on the surfaces of the walls of the cavities, and gradually form bone-substance with lamellæ, Haversian canals and lacunæ. Thus a spongy or cancellous tissue is formed; the calcified matrix disappears, and many of the spaces open into one another. (5) Simultaneously with the changes in the cartilage matrix, a layer of osseous substance has been formed beneath the periosteum, which continues to increase in thickness, being deposited around the osteoblasts, and finally compact bone is formed. (6) The spongy bone formed as described in (4) is not permanent, the greater part of it being absorbed to form the medullary cavities. At birth the compact tissue which surrounds the shaft has been formed from the periosteum, while the cancellous tissue at the ends of the bone and elsewhere has been formed from the cartilage. (7) The absorption of the walls of the primary areolæ (the calcified matrix) is effected by certain cells termed *osteoclasts*, or the myeloplaxes of Robin. They are situated in depressions or pits called Howship's lacunæ.

Intramembranous ossification.—In certain bones (named above) development proceeds direct from membrane, as in periosteal ossification, without the intervention of cartilage. The matrix, like the periosteum, is made up of layers of fiber tissue, with large nucleated cells—the osteoblasts—and blood-vessels. By deposition of lime salts around the osteoblasts and blood-vessels, bone substance, at first more or less spongy, is formed. The membrane or matrix, in which ossification proceeds, consists of indistinct fibers and ground substance, densely packed with large granular corpuscles."—(Ashby's *Notes on Physiology.*)

2. The *hip-joint* is a ball and socket joint formed by the reception of the head of the femur into the acetabulum. The articulating surfaces are covered with cartilage, and at the circumference of the acetabulum is an incomplete cartilaginous ring. The ligaments are: Capsular, iliofemoral, teres, cotyloid, and transverse.

3. THIRD CRANIAL NERVE. *Superficial origin:* inner side of crus cerebri, just in front of pons. *Deep origin:* floor of aqueduct of Sylvius. *Course:* Pierces dura mater to enter canal in outer wall of cavernous sinus near posterior clinoid process, lying above and internal to 4th nerve. As it passes forward to enter orbit through sphenoidal fissure the 4th nerve and frontal branch of the 5th cross and become superior to it. It divides into two branches in the fissure, which enter orbit between the heads of the external rectus, the nasal branch of the 5th lying between the two; while in cavernous sinus it communicates with cavernous plexus. *Distribution:* Superior branch supplies superior rectus and levator palpebræ. Inferior divides into three, for internal rectus, for inferior rectus, and for inferior oblique, which latter gives off short or motor root to the lenticular ganglion."—(*Aids to Anatomy.*)

4. *The preaxial muscles* are: Pectoralis major, pectoralis minor, subclavius, coracobrachialis, biceps, brachialis anticus, pronator radii teres, flexor carpi radialis, palmaris longus, flexor carpi ulnaris, flexor sublimis digitorum, flexor profundus digitorum, flexor longus pollicis, pronator quadratus, palmaris brevis, abductor pollicis, opponens pollicis, flexor brevis pollicis, abductor minimi digiti, opponens minimi digiti, flexor brevis minimi digiti, adductor pollicis, interosseous, psoas magnus, iliacus, pectineus, gracilis, adductor longus, adductor brevis, adductor magnus, quadratus femoris, obturator externus, obturator internus, gemellus superior, gemellus inferior, biceps femoris, semitendinosus, semimembranosus, gastrocnemius, soleus, plantaris, flexor longus digitorum, flexor longus hallucis, tibialis, posticus, flexor accessorius, popliteus, flexor brevis digitorum, flexor brevis hallucis, abductor hallucis, abduc-

tor minimi digiti, lumbricales, adductor hallucis, interosseous, flexor brevis minimi digiti.

The pectoralis minor is inserted into the coracoid process of the scapula.

5. The *lymphatic system* consists of lymphatic glands, perivascular lymph spaces, lymph vessels, lymph canalicular system, lacteals, and body cavities. They are connected by anastomotic channels.

6. *Emissary veins:* "These are communications between the sinuses within and the veins outside the cranium. Most of them are temporary, corresponding to the chief period of growth of the brain. Thus in early life, when the development of the brain has to be very rapid, owing to the approaching closure of its case, a free escape of blood is most essential, especially in children, with their sudden explosions of laughter and passionate crying. (1) Vein through the foramen cæcum, between the anterior extremity of the superior longitudinal sinus and the nasal mucous membrane. The value of this temporary outlet is well seen in the timely profuse epistaxis of children. Other more permanent communications between the skull cavity and nasal mucous membrane pass through the ethmoid and internal orbital foramina. The fact that the nasal mucous membrane is loose and ill supported on the turbinated bones allows its vessels to give way readily, and thus forms a salutary safeguard to the brain, warding off many an attack of apoplexy. (2) Vein through the mastoid foramen, between the lateral sinus and the posterior auricular and occipital veins. This is the largest, the most constant, and the most superficial of the emissary veins. Hence the old rule of applying blisters or leeches over it in cerebral congestion. (3) Vein through the posterior-superior angle of the parietal between the superior longitudinal sinus and the veins of the scalp. (4) Vein through the posterior condyloid foramen between the lateral sinus and the deep veins of the neck. (5) Vein through the anterior condyloid foramen between the occipital sinus and the deep veins of the neck. (6) Ophthalmic veins communicating with the cavernous sinus and the angular vein. These veins may be the source of fatal blood-poisoning, by conveying out of reach septic material, in acute periostitis of the orbit, or in osteitis, of dental origin, of the jaws. (7) Minute veins through the foramen ovale between the cavernous sinus and the pharyngeal and pterygoid veins. (8) Communications between the frontal diploic and supraorbital veins, between the anterior temporal diploic and deep temporal veins, and between the posterior temporal and occipital diploic veins and the lateral sinus. The gravity of these emissary veins and their free communications with others is shown by the

readiness with which they become the seat of septic thrombosis, and thus of blood-poisoning, in cranial injuries, erysipelas, suppuration of the scalp, and necrosis of the skull."—(Morris' *Anatomy.*)

7. *Abdominal viscera wholly covered by peritoneum:* Stomach, first part of duodenum, jejunum, ileum, cecum, transverse colon, sigmoid flexure, first part of rectum, liver.

8. RECTUM. *Nerve supply:* Sympathetic plexuses (inferior mesenteric and hypogastric), fibers from the second, third, and fourth sacral nerves. *Blood supply:* Superior, middle, and inferior hemorrhoidal arteries and veins.

PHYSIOLOGY.

1. There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged, the second, or diastolic, sound is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup.*

The first sound is heard best at the apex beat in the fifth left intercostal space; the second sound is heard best over the second right costal cartilage.

The *causes* producing the *first* sound of the heart are not definitely ascertained; the following are supposed to be causatory factors: (1) The vibration and closure of the auriculo-ventricular valves, (2) the muscular sound produced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall.

The *second* sound is caused by the vibration due to the closure of the semilunar valves.

2. *Haversian canals* are minute canals about 1/500 of an inch in diameter, found in long bones; they anastomose freely with each other; they communicate externally with the periosteum and internally with the medullary cavity; and during life they lodge an artery, vein, nerve and lymphatic. They form the center of an Haversian system. *The function of the Haversian canals:* They serve to conduct arteries, veins, lymphatics, and nerves to and from the bone substance.

3. *Emulsification* is a physical process by which fat globules are split up into very minute particles capable of being absorbed by the villi of the intestine.

Saponification is a chemical process by which a fatty acid in combination with an alkali produces a soap and glycerin.

Both of these processes are accomplished by the steapsin of the pancreatic juice.

4. *Rigor mortis* is a condition of rigidity assumed by the muscles after death. It is supposed to be due to the coagulation of the myosinogen. The muscles lose their irritabil-

ity and pass into a condition of contraction. Heat is evolved, carbon dioxide is given off, and the muscles become acid in reaction due to the development of sarcolactic acid. Rigor mortis usually sets in first in the muscles of the lower jaw, face, and neck, then in those of the thorax, abdomen, upper extremity and lower extremity. It usually lasts for from twenty-four to forty-eight hours, and disappears in the same order as the onset.

5. *Excretion of urine:* According to Bowman's theory, the watery part of the urine (with the soluble inorganic salts) is filtered from the capillaries in the glomerulus through the flattened epithelial cells of Bowman's capsule, into the lumen of the uriniferous tubule; and the nitrogenous substances (urea, uric acid, creatinin, etc.) are excreted by the cubical cells lining the tubules.

6. SECRETIONS OF ALIMENTARY CANAL. (1) *Saliva,* alkaline; active principle, ptyalin. (2) *Gastric juice,* acid; active principles, pepsin and rennin. (3) *Pancreatic juice,* alkaline; active principles, trypsin, amylopsin, steapsin, and a milk-curdling ferment. (4) *Succus entericus,* alkaline; active principle, invertin. (5) *Bile,* alkaline; it contains no "active principles," but bile salts (sodium taurocholate and sodium glycocholate), and bile pigments (bilirubin and biliverdin).

7. *Respiration* is the process by which an interchange of gases takes place in the lungs; so that oxygen is introduced and carried to the tissues, and carbon dioxide is expelled. See Gray's "Anatomy" (1910), page 423.

The changes produced in the *air* by respiration are:

	INSPIRED AIR.	EXPIRED AIR.
Oxygen	21 per cent.	16.6 per cent.
Nitrogen	79 per cent.	79 per cent.
Carbon dioxide...	0.04 per cent.	4.4 per cent.
Other gases.....	Rare.	Often present.
Watery vapor....	Variable.	Saturated.
Temperature	Variable.	That of the body.
Volume	Varies.	Diminished.
Bacteria	Always present.	None.
Dust	Always present.	None.

8. *Function of adipose tissue:* (1) It is a reserve store of food; (2) it serves as a protection for delicate structures; (3) it preserves the heat of the body.

CHEMISTRY.

1. Chemical formula, of iron sulphate, $FeSO_4$; of hydrocyanic acid, HCN; of corrosive sublimate, $HgCl_2$; of zinc sulphate, $ZnSO_4$.

2. As a rule a solution of potassium permanganate will be rapidly decolorized in the presence of organic matters. If such organic matter is nitrogenous it can be detected by the Wanklyn or Frankland method.

3. Phosphorus is found in nature as phosphate (chiefly calcium phosphate).

4. Antidote for corrosive sublimate is milk or white of egg; this forms the albuminate of mercury, which is insoluble.

5. The *halogens* are: Fluorine, chlorine, bromine, and iodine. They are all univalent; they form hydracids; they are all irritant and corrosive; they all possess bleaching and disinfecting properties; their hydroxides (except fluorin, which has none) are monobasic acids.

6. *Physical actions which have a tendency to decompose compound substances:* Light, heat, and electricity.

7. *Four chief elements entering into the formation of organic compounds:* Carbon, hydrogen, oxygen, and nitrogen.

8. In testing urine for sugar, with Haines' solution: By the action of the boiling alkaline solution glucose is converted into substances which (being prone to oxidation) are good reducing agents. These latter reduce the cupric sulphate into cuprous sulphate, and this in time is decomposed with the deposition of cuprous oxide.

MATERIA MEDICA.

1. Ichthyol is obtained from ichthyosulphuric acid, which comes from a crude oil obtained by destructive distillation of fossil fish found in the earth in the mountains of Tyrol. It is used in inflammatory conditions generally, erysipelas, ulcers, indurated glands, joint affections, rheumatism, certain chronic skin diseases, chronic inflammations of the pelvic viscera, and in gynecological practice.

2. FOWLER'S SOLUTION. *Official name:* Liquor potassii arsenitis. *Composition:* Arsenic trioxide 10, potassium bicarbonate 20, compound tincture of lavender 30, and distilled water to 1,000. *Dose:* Three minims.

DONOVAN'S SOLUTION. *Official name:* Liquor arseni et hydrargyri iodidi. *Composition:* Arsenous iodide 10, red mercuric iodide 10, distilled water to 1,000. *Dose:* One and a half minims.

3. *Two alkaloids of opium:* Morphine, *dose* gr. ¼; and codeine, *dose* gr. ½.

Two derivatives of morphine: Apomorphine, dose of the hydrochloride (as an emetic) gr. 1/10; and dionin, *dose* gr. ¼.

4. DIGITALIS. *Active principles:* Digitalin, digitalein, digitin, digitonin, and digitoxin. *Official preparations and doses:* Fluidextract, ♏j; extract, gr. 1/5; tincture, ♏xv;

infusion, ℥ij. *Digitalis is contraindicated* in: Diseases of the heart, (1) in aortic lesions, when uncombined with mitral lesions; (2) when the heart action is strong and arterial tension high.

5. *Hypodermic dose* of: Strychnine sulphate, gr. 1/60; atropine sulphate, gr. 1/180; nitroglycerin, ½ minim of a 1 per cent. solution; physostigmine, gr. 1/100.

Therapeutic uses of atropine: To relieve pain, relax spasm, check sweating, as a mydriatic, for night sweats, to check griping of purgatives; in asthma, to check fevers, in heart disease, shock, and collapse, acute coryza, urinary incontinence, chordee, low delirium of fevers, mania, alcoholism; as an antigalactagogue, and for spasmodic cough.

Therapeutic uses of nitroglycerin: In renal degeneration with high arterial tension, angina pectoris, cardiac dyspnea, epilepsy, various spasmodic conditions.

6. SODIUM SULPHATE. *Common name:* Glauber's salt. *Therapeutic uses:* As a saline purgative, as a cholagogue, for gallstones, also in nervous diseases. *Dose:* ℥iv.

7. ACONITE. *Principal alkaloid.* Aconitine, dose gr. 1/400. *Official preparations:* Fluidextract, dose ♏j; tincture, ♏x.

Physiological action: It first stimulates, and then paralyzes the heart and also the sensory nerves, lowers blood pressure, dilates the peripheral blood-vessels, is a respiratory sedative, reduces body temperature, is a diuretic and diaphoretic. It is *contraindicated:* In adynamia, weak cardiac action, degeneration or dilatation of the heart, and gastrointestinal irritation or inflammation. *Antidotes:* Digitalis, atropine, and strychnine.

8. SALOL. *Source:* Heating phenol and salicylic acid in the presence of phosphorus pentachloride. *Dose:* Gr. vij. *Indications:* As a disinfectant, in inflammations of the mouth and pharynx, in cystitis, as an intestinal antiseptic in typhoid fever, in muscular rheumatism, in intestinal indigestion and fermentation, and in cholera. *After administration it is subdivided into:* Salicylic acid and phenol.

PATHOLOGY.

1. *Cyanosis of the face* might be caused by: Valvular disease of the heart, myocarditis, emphysema, asthma, pneumonia, phthisis, bronchitis, foreign body in the air passages.

Jugular pulsation might be caused by: Tricuspid regurgitation, anemia, thoracic aneurysm communicating with the superior vena cava.

General anasarca might be caused by: Cardiac disease, or weakness, renal disease, multiple neuritis, trichinosis, Hodgkin's disease.

2. *Suppurative* inflammation is characterized by the formation of pus; *plastic* inflammation is one in which the exudate causes adjoining structures to adhere.

3. *Pathology of a decayed tooth:* "The primary stage of caries is determined by the presence at a certain portion of a tooth of an acid capable of dissolving the inorganic salts. The matrix of the prisms is the first to be dissolved, and into the spaces thus formed crowd organisms which, given a suitable pabulum, produce more acid and further destruction of the surrounding tissue. There is good reason to believe that, apart from its natural resistance to solution, the enamel offers no vital resistance to attack. After the solution of the enamel the dentine is decalcified in a similar manner, and later the remaining organic portion of the tooth substance is digested by the bacteria, which perform their work by means of secreted enzymes, digesting the tissue in much the same way as the pepsin of the gastric juice acts upon albuminous materials. . . . Dental caries is, as a rule, a progressive disease, but under certain conditions its progress becomes arrested. In such cases the teeth generally show an extensive loss of tissue, the enamel of the masticating surfaces, and even of the sides, having disappeared. The exposed dentine is darkly stained, and presents to the eye a polished appearance. An examination with a probe will show that the dentine is as hard as, if not harder than, in the normal condition. This state, which is known as *spontaneous arrest of caries*, may be found in both the deciduous and permanent teeth; in the latter the condition is most frequently met with in hypoplastic first permanent molars. It occurs only in teeth with living-pulps, and the appearance of the teeth suggests that the disease, when active, was of a general and rapid character. Microscopical examination shows that the dentine retains the color of carious dentine, or is perhaps slightly darker. The dentinal tubes, which can be easily seen in the discolored part, end apparently upon the surface."—(Colyer's *Dental Disease*).

4. *Arthritis deformans:* "There are, first, alterations in the cartilages of the joints, consisting of softening and ulceration or erosion, which make the surface irregular and rough. At the same time some hyperplasia of the cartilage-cells takes place, but the hyperplastic elements subsequently undergo degeneration, and are absorbed. In this way the cartilage is gradually reduced and the ends of the bone laid bare. The synovial membrane and ligaments at the same time become thickened by hyperplasia. Subsequently the articulating end of the bone is involved. There is, first, absorption, and secondarily proliferative changes at the periphery of the articulation, in the form of exostoses or osteophytes. The joint is considerably deformed

and thickened. Subluxations are common, and the deformity leads to immobility of the joint, or ankylosis."—(Stengel's *Pathology.)*

5. *Medullary carcinoma of the breast* is characterized by its softness, and the abundance of fluid it contains. It is of rapid growth, and attaches itself to the skin.

6. Hemorrhage, pneumonia, cardiac weakness, paralysis, nephritis, albuminuria, septic infection.

7. *Endocarditis* is generally due to rheumatism, chorea, pneumonia, scarlet fever, puerperal sepsis, gonorrhea, and infection generally.

"The most common seats are the mitral valve, then the aortic and pulmonary valves. In fetal endocarditis the right side of the heart is more frequently involved. Instead of the edge the lesion first occurs on the line of closure. The endocardium becomes opaque and small, irregular nodules appear (*verrucose endocarditis.*) These elevations consist of layers of fibrin, beneath which is the endocardium, showing desquamation of the endothelium with also round-cell infiltration and proliferation of the fixed connective-tissue cells. In the masses of fibrin will be found blood plates, leukocytes, and frequently bacteria. The process may terminate by a degeneration of the vegetations with the formation of scar tissue and subsequent thickening and contraction. There may also be marked calcareous infiltration. If the condition continues there may be destruction of the valve, *ulcerative endocarditis.* In this there is a superficial necrosis of the valve with a deposit of fibrin upon the ulcerated surface. As the lesion progresses the leaflet may become weakened and distended by the blood-pressure, forming an aneurysm of the valve. Perforation may occur and portions of the leaflet, or of the fibrin mass may be set free in the blood as emboli. These generally contain bacteria, and, lodging in the brain, kidney, and spleen, will give rise to metastatic abscesses."—(McConnell's *Pathology.*)

8. *Inflammation.* "The phenomena of inflammation are dilatation of the arterioles, capillaries, and small veins. At first the blood-current is quickened, then retardation occurs, and may progress to stasis and thrombosis. During this time exudation of plasma and white corpuscles from the small veins, and perhaps the capillaries, is going on. The fate of the white cell may be either to break up and set free prothrombin, or to act as food for connective-tissue cells, or to act as a phagocyte and be transformed into a pus corpuscle. Red corpuscles may be exuded and broken up, setting free their coloring matter. The prothrombin of the white cells unites with the calcium chloride of the plasma, and forms thrombin, or fibrin ferment, which acts upon the fibrinogen of plasma to form fibrin.

The *tissues* are thus invaded with numbers of leucocytes. In bacterial inflammation a varying portion of the tissues is killed by the toxins produced, and is either replaced by a mass of small round cells, or liquefied into pus. In the latter case it is surrounded by a ring of small round cells. The connective-tissue cells absorb the leucocytes, and new vessels are formed, thus constituting repair. In non-bacterial inflammation, exudation may separate layers of cells to a large extent and form blebs. In chronic inflammation the formation of new fibrous tissue is the chief part of the process."—*(Aids to Surgery.)*

SURGERY.

1. *General anesthesia* may be produced by: Ether, chloroform, nitrous oxide, ethyl chloride; *local anesthesia*, by: Cocaine, eucaine, ethyl chloride. There are others, but these are the most commonly used. For overdose of any of the general anesthetics, remove the inhaler, and start artificial respiration, make traction on the tongue, lower the patient's head, or invert him, give hypodermic of atropine, apply faradism to the phrenic nerve, put hot water bottles to the extremities, let plenty of fresh air into the room, give an enema of hot salt solution; in some cases of chloroform poisoning direct heart massage has been employed. The sphincter ani may be stretched; and bleeding from the external jugular vein may be tried.

2. *Bacteria of suppuration: Staphylococcus pyogenes aureus, Staphylococcus pyogenes albus, Staphylococcus pyogenes citreus, Streptococcus pyogenes, Bacillus pyocyaneus, Micrococcus tetragenas,* gonococcus, colon bacillus, typhoid bacillus, pneumococcus. The *order of virulence* is not settled.

3. *Indications for trephining:* "Intracranial hemorrhage, abscess, fracture, foreign body, evacuation of cerebrospinal fluid through the lateral ventricle, as a preliminary step to osteoplastic resection and to linear craniectomy, epilepsy, bullet and other wounds, small tumors, drainage of frontal sinus, drainage of mastoid antrum and cells, thrombosis of venous sinuses."—(Bickham's *Operative Surgery.*)

"The patient's head is rested on a sandbag and held steady by an assistant. The skull is exposed. Make the center pin of the trephine protrude about one-sixteenth of an inch beyond the cutting-edge and bore it into the skull at the selected site. By steady movements of the wrist, twist the trephine from left to right and right to left until it has cut a groove in the skull. Withdraw the center pin and proceed with the trephining. As soon as the outer table of the skull is penetrated there will be less resistance to the operation and more escape of blood. As soon as hard bone is again met, proceed with increased caution. The

inner table is often very thin. After every few movements of the instrument probe the groove in the skull with the blunt end of a straight needle. If probing shows greater penetration at one part of the groove than another, lessen the pressure of the trephine at that point. The inner table is usually found divided at one place before another; when this is the case, by slightly tilting the trephine the place where penetration has already taken place is avoided while the rest of the skull is being divided. As soon as the bone is divided the resulting button is easily removed and the dura mater exposed. Along the edges of the osseous hole there will always be found projecting spicules; these must be cut away with rongeur forceps. If bleeding from the cut bone is severe, it may be stopped by sponge pressure or by slightly crushing the bone between the jaws of a rongeur forceps."—(Binnie.)

4. Psoas Abscess. *Symptoms:* Neuralgia, aching across the back, cramp, inability to extend the thigh, inward rotation of the thigh; deep pressure in abdomen over the semilunar line reveals a tumor which is sausage-shaped, vertical, and fluctuating. It may show as a tumor near Poupart's ligament. *Treatment:* Open it about Poupart's ligament, and external to the line of the vessels; be careful about antisepsis; free drainage and antiseptic dressings; tonics and supportive treatment.

5. An *osteoclast* "is an instrument consisting of a bar on which are two padded rings, and between them a padded metal plate, connected with a screw; the pressure exerted by this screw breaks the bones of the limb placed through the rings."—(Scott's *State Board Surgery.*) *Indications for its use:* Knock-knee, bow-legs, and fractures which have united with great deformity.

Perineal prostatectomy "may be performed through a curved transverse incision, convexity forward, reaching from one ischial tuberosity to the other, or one of its modifications, but the easiest and simplest is the median incision as in perineal cystotomy. The membranous urethra is opened, and the prostate pulled downwards by a sound passed into the bladder, or by special tractors devised for this purpose, and enucleated after incising its fibrous sheath. The bladder is drained by a tube emerging through the perineum, and the wound packed with gauze. The drain may be removed in a few days, the after treatment being the same as that of perineal cystotomy. Young incises the capsule outside of the seminal ducts, in order to preserve these structures, and removes the rest of the gland; others make a transverse perineal incision, and excise V-shaped portions of the lateral lobes without opening the urethra or bladder."—(Stewart's *Surgery.*)

7. *Causes of esophageal stricture:* (1) *Intraesophageal*

—foreign body, mass of food. (2) *Interstitial*—Neoplasm; cicatricial tissue, as from toxic gastritis, ulcer (syphilitic, peptic); esophageal abscess; diverticula filled; congenital; spastic structure. (3) *Extraesophageal*—Enlarged glands (sternal, cervical, bronchial, from tuberculosis, cancer, suppurative adenitis); mediastinal or cervical cellulitis; vertebral disease; dislocation of hyoid bone or clavicle; cancer of pleura or lung; ossification of stylohyoid; ligament, swelling of cricoid; pericardial effusion, cardiac hypertrophy, aneurysm.

Treatment: Gradual dilatation with bougies every few days; if near the stomach, open that viscus and try retrograde dilatation; esophagotomy has been advocated; gastrotomy may be necessary in order to feed the patient.

8. Make the incision from just behind and a little above the handle of the malleus; cut downwards and backwards.

The indications for paracentesis tympani are: Undue distention in otitis media, hyperemia, and infiltration of the membrana tympani, or for purposes of exploration.

OBSTETRICS.

Diagnosis of presentations: "The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contrasting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and to confirm this fact the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the hand, and changing their position from time to time. Having located the back and the extremities, the portion of the fetal ellipse presenting at the superior strait is next ascertained. The examiner now faces the woman's feet and, with the outstretched hands, the fingers parallel with and the middle finger over the center of Poupart's ligament into the pelvic cavity. If the head is presenting, it is felt as hard, regular, round body, the greater mass of the occiput, the sharp point of the chin, and the groove between occiput and back being often distinguishable. At the same time, the density of the head, its compressibility, its approximate size, and its relative size to the pelvis may be learned."—(Hirst, *Obstetrics.*)

2. Danger to cord are pressure, prolapse, short cord, and rupture. *Treatment of prolapsed cord:* "The funis should be pushed up above the inlet in the interval between pains,

and when the presentation is forced down by a contraction it will probably be retained. This can be done by the fingers or by repositors invented for the purpose, and may be aided by placing the woman in the knee-chest posture. It can also be done by carefully placing a loop of tape around the funis, attaching it to a moderately hard catheter, and pushing it gently back into the empty pelvic diameter. If the advance of the presentation does not retain it, a small piece of sponge passed between the head and the inlet will often succeed. If the cord is surely pulseless it may be let alone, but if the child is alive and the funis cannot be retained, prompt artificial delivery is indicated."—(Landis' *Obstetrics.*)

In case of short cord, deliver by main force until the cord can be reached and cut, or ruptured.

3. *Cesarean section* (conservative). "*Indications:* The cases in which it is performed are: (1) Extreme deformity of the pelvis, in which delivery by forceps and version is excluded, and in which craniotomy is either impossible or would be more dangerous to the mother than cutting into the abdomen and uterus; and in which there is not room for a successful symphyseotomy. Such cases present the '*positive*' indication for cesarean section; there is nothing else to be done. Flat pelves having a conjugata vera of 2¼ inches or less, and justo-minor pelves with a conjugata vera of 2½ inches or less, present this positive indication; (2) cases of more moderate pelvic contraction in which craniotomy is possible, but cesarean section is agreed upon to *save the life of the child;* (3) mechanical obstruction in the pelvis from fibroid, cancerous, bony, or other tumors which cannot be pushed up out of the way or be safely removed; (4) irreducible impaction of a *living* child in transverse presentations; (5) in women dying near the end of pregnancy the child, if alive, is rapidly delivered by *post-mortem* cesarean section; (6) various other obstructions from inflammatory adhesions, atresia, constrictions, etc., of the vagina, and uterine displacements, may rarely require the operation; (7) recently the operation has been done in eclampsia cases, where more conservative methods of rapid delivery were impracticable; and (8) in placenta prævia, chiefly with a view to lessen the infant mortality attending the usual treatment of this complication."—(King's *Obstetrics.*)

4. *Four causes of dystocia:* Uterine inertia, deformed pelvis, transverse presentation, and prolapsed cord. For treatment of latter, see question 2.

5. If the breech is low in the pelvis and it is impossible to pass a hand into the uterine cavity to seize a foot, it may be allowed to apply forceps over the trochanters. By avoiding compression of the handles, and simply making

traction, the breech may be extracted without danger to the child.

6. *Involution* is the process by which the uterus, after labor, returns as far as possible to its original size. *Subinvolution* is any arrest or retardation of the process of involution.

7. *After pains* are pains sometimes occurring after labor, and due to uterine contractions. *Causes:* Retained clots, imperfect uterine contractions, over distention of uterus during labor. *Treatment:* Empty uterus properly in third stage of labor; give anodynes, ergot, laxatives or enemata; and if necessary remove clots.

8. Decidua, chorion, and amnion.

HYGIENE.

1. By the use of a common drinking cup disease may be transmitted; it is also an unsanitary and unclean habit.

2. The *Oxyuris vermicularis* resembles a piece of white thread, is 1/6 to ½ inch in length, the head has a mouth with three lips, and the tail terminates as a sharp point. Avoid uncooked fruit and vegetables.

Ascaris lumbricoides about 12 inches long, pinkish red in color, with pointed extremities. Mouth shows three lips. Avoid drinking water that has not been boiled and filtered.

Tænia solium, about 10 feet long, may have 800 or more flattened segments, head is globular, and about size of a pin's head, with four sucking discs and two rows of hooklets. Avoid eating pork, especially if it is not well cooked.

3. Hygienic precautions to be taken in treating a case of tuberculosis: "The patient's quarters should be free from dust and admit of spending many hours daily in the open air in all weathers, properly sheltered, and, if very ill, lying wrapped in a hammock or reclining chair. His bedroom should be well aired at night, drafts being avoided. The room should be uncarpeted and free from hangings. It should be often cleaned and periodically disinfected. All sputum should be collected in paper spit-cups, which should be burned daily. Smoking should be forbidden. Harm is done by any exercise which results in fatigue, and while fever exists it should not be attempted at all. Patients should be taught the necessity of practising lung gymnastics and breathing only through the nose, which should be kept clear and free from occlusion by secretions, or an hypertrophied catarrhal mucosa. * * * The clothing should be woolen, but not too heavy, or sweating is increased; and a flannel nightgown and loosely knit leggings should be worn at night in cool weather. The skin should be cleansed by daily sponge-baths of lukewarm alcohol and water."—(Thompson's *Practical Medicine.*)

4. ***Milk may be sophisticated or adulterated*** by: (1)

Skimming; (2) the addition of water; (3) the addition of coloring matter, such as caramel, annatto, or methyl orange; (4) the addition of preservatives, as boric acid, formaldehyde, salicylic acid, or salicylates; (5) the addition of arrowroot, flour, sugar, glycerine, chalk, or sodium carbonate.

5. Malaria is *caused* by the *Plasmodium malariæ*, but *carried* by the anopheles mosquito. The cause of yellow fever is not yet determined, but it is *carried* by the stegomyia mosquito.

6.

	INCUBATION PERIOD.	QUARANTINE TIME.
Scarlet fever	2 to 7 days	10 days
Measles	10 to 16 days	16 days
Smallpox	8 to 14 days	16 days
Mumps	10 to 15 days	21 days
Diphtheria	3 to 5 days	12 days

For *disinfection of rooms* use formaldehyde gas; *clothing*, use solution of phenol (5 per cent.) for an hour, then boil for an hour; *person*, wash in soap and water, and then with cresol or carbolic acid solution; *bedding*, use steam or formalin; *excreta*, etc., should be passed into vessels containing dilute solution of formalin, of greater quantity than the expected excretion.

7. "The physician consulted by a patient with *gonorrhea* who wishes a professional sanction to his marriage should demand a period on an average of six months.

"The general rule which may be formulated as safe for a *syphilitic* man to marry, so far as contagious risks to his wife are concerned, is that a period of four years should have elapsed since the chancre; that he should have been free from manifestations during the last twelve or eighteen months of this period, and that he should have received sufficient specific treatment."—(Morrow's *Social Diseases and Marriage.*)

8. An *endemic* disease is one that is always more or less prevalent in a certain locality. An *epidemic* disease is one that attacks simultaneously, or in rapid succession, many persons in the same locality; or that spreads rapidly over a large territory.

MISSOURI.

STATE BOARD EXAMINATION QUESTIONS.

MISSOURI STATE BOARD OF HEALTH.

ANATOMY.

1. Describe superficial and deep palmar arch; how formed? Give landmarks.
2. Name all muscles that elevate the arm at shoulder joint, giving origin and insertion of same.
3. Give minute and gross anatomy of kidneys.
4. Give minute and gross anatomy of pleura.
5. Give origin, ending, branches, and relationship of posterior tibial artery.
6 Describe the tibia, giving points of ossification. With what bones does it articulate?
7. Draw cross section amputation of forearm, middle third, naming structures divided.
8. Give origin, course, exit, and parts supplied by the second pair of cranial nerves.
9. Describe anterior triangle of neck, how formed, giving contents.
10. Describe the spinal column, giving characteristics of vertebra in each division.

PHYSIOLOGY.

1. State the general character and physiological action of the hydrocarbon and albuminoid substances.
2. Give mode of secretion and composition of the gastric juice.
3. Give physiological action of the saliva.
4. Describe the blood and give the composition of the red and white globules.
5. Explain the cause of coagulation of the blood and its usefulness.
6. Give the composition of the urine and state which constituent is the most important.
7. State the most important function of the medulla oblongata as a nervous center, with full explanation of same.
8. Name and give function of first pair of cranial nerves.
9. Give origin and function of fifth pair of cranial nerves.
10. State the general arrangement and function of the sympathetic nervous system.

CHEMISTRY.

1. Describe and state the physical and chemical properties of oxygen.
2. Give the chemical formula for potassium iodide, and state how it is made.

3. Name the four elements known as Halogens, and describe each.

4. Give chemical formula for phenic acid. From what derived? For what purpose used in medicine? Give treatment for toxic dose.

5. Give chemical formula for sulphuric acid. How obtained? Give toxic dose. For what purpose used in medicine?

BACTERIOLOGY.

1. Describe the process of producing diphtheria antitoxin.

2. Give theory of immunity produced by vaccination.

3. What diseases confer immunity by vaccination or innoculation?

4. Give the technique for staining for the pneumococcus.

5. Describe in detail process of finding tubercle bacilli in a specimen of urine.

PATHOLOGY.

1. What is aortic stenosis? Give pathology.

2. What is the pathological condition found in chronic Bright's disease?

3. Give the pathology in specific iritis.

4. What pathological conditions are found in acute catarrhal dysentery?

5. Give pathology of chronic gastritis.

THERAPEUTICS.

1. Name the officinal preparations of opium. Give dose and therapeutic uses.

2. Give the physiologic action and therapeutic uses of colchicum.

3. Give the dose and therapeutic indications for bryonia.

4. Name the officinal preparations and give therapeutic uses of calcium phosphate.

5. Give the dose and therapeutic uses of veratrum.

6. Give the dose, physiologic action, and therapeutic uses of ipecac.

7. Name the officinal preparations, give the dose and therapeutic uses of nux vomica.

8. Give the dose and therapeutic indications for tartar emetic.

9. Give the dose and therapeutic indications for aconite.

10. Name the officinal preparations of cinchona. Give dose and therapeutic uses.

PRACTICE.

1. Give etiology, exciting cause, and treatment of variola.

2. What are the methods of physical diagnosis, and what phenomena are obtained by these methods?

3. Give etiology, symptoms, and treatment of lobar pneumonia.

4. What are the physical signs of incipient pulmonary tuberculosis? What is the treatment?

5. What is the etiology and treatment of typhoid fever?

6. Give the symptoms and treatment of acute bronchitis.

7. What are the symptoms of acute Bright's disease, and how should it be treated?

8. What is a cataract, and how would you treat it?

9. How would you diagnose a case of non-suppurative otitis media? What is the treatment?

10. What are the conditions found in psoriasis? What is the proper treatment for same?

OBSTETRICS.

1. Describe pregnancy from ovulation to maturity of fetus, giving mechanism of delivery in an L. O. A. presentation.

2. Describe placenta prævia, giving varieties, causes, diagnosis, and treatment.

3. Differentiate hand from foot, knee from elbow, shoulder from vertex. Give management of shoulder presentation.

4. Define eclampsia, giving etiology, prognosis, and treatment.

5. When should chloroform be used in labor? Ditto ergot? Give advantages and dangers of each.

6. When should forceps be used? Give manner of applying the same, with mechanism of delivery after application, selecting your own presentation.

7. Differentiate false from true labor pains. Give stages of labor and what occurs during each stage.

8. Describe asphyxia of new born, giving varieties and treatment.

9. Give your method of caring for the new born from birth until it is dressed.

10. Give signs of pregnancy at third and sixth months.

GYNECOLOGY.

1. Define vulvitis. Give varieties, causes, and treatment.

2. Define vaginitis, giving varieties, causes, and treatment.

3. Define menstruation. Name disorders of same, giving usual causes and treatment of each.

4. Define metritis. Give varieties, causes, and treatment of each.

5. Give differential diagnosis in inversion, polypi, prolapsus uteri, and method of treating each.

SURGERY.

1. Give differential diagnosis between brain abscess and brain tumor.
2. Describe an operation for cure of femoral hernia.
3. Give symptoms and treatment of acute osteomyelitis.
4. Give diagnosis between gastric cancer and ulcer.
5. What is the treatment of gunshot wound of the knee from a revolver wound?
6. Give the signs and symptoms of tuberculosis of the kidney.
7. Differentiate between an old dislocation and tuberculosis of hip joint.
8. What is the best treatment for a fracture about the elbow joint? Why?
9. Give signs and symptoms of intussusception.
10. What operation do you consider profitable for removal of prostate gland? Give reasons.

HYGIENE.

1. Give etiology and prophylaxis of ophthalmia neonatorum.
2. Discuss etiology, prophylaxis and hygienic care of cholera infantum.
3. Name three infections transmitted through air; through water; through food; through insects. Give prophylaxis.
4. Give period of incubation, length of quarantine and hygienic care of the following diseases: Smallpox, scarlatina, diphtheria, measles.
5. Discuss vaccination and antitoxine, giving brief history of each, and value of same.

MEDICAL JURISPRUDENCE.

1. What evidence would you look for to distinguish cerebral concussion from intoxication?
2. What evidences determine a recent from an old cerebral hemorrhage?
3. What is malpractice—civil, and criminal?
4. In case of drowning, how would you determine whether homicidal, suicidal, or accidental?
5. In case of hanging, what circumstantial evidence would you look for, to determine whether the act was homicidal, or suicidal?
6. Where a question arises as to personal identity, in what manner, or by what tests would you determine it?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

MISSOURI STATE BOARD OF HEALTH.

ANATOMY.

1. The *superficial palmar arch* is formed by the ulnar artery, and is completed by the ulnar artery anastomosing with a branch of the radial (superficial volar or princeps pollicis). It gives off the four digital branches. The surface marking is a line drawn transversely across the palm from a point where the web of the thumb joins the palm. The *deep palmar arch* is formed by the radial artery, and is completed by the radial artery anastomosing with a deep branch of the ulnar. Its branches are the palmar interosseous, perforating, and palmar recurrent arteries. The surface marking is a line drawn transversely across the palm, one-half inch nearer the wrist than the superficial arch.

2. Muscles that elevate the arm at the shoulder are: Deltoid and supraspinatus.

DELTOID. *Origin:* From the outer third of anterior border and upper surface of the clavicle, from the outer margin and upper surface of the acromion process, and from the lower edge of the spine of the scapula. *Insertion:* Into the deltoid impression on the middle of the outer side of the shaft of the humerus.

SUPRASPINATUS. *Origin:* From the supraspinatus fossa and fascia. *Insertion:* Into the great tuberosity of the humerus.

3. "The kidneys are situated in the lumbar region, opposite the last dorsal and two or three upper lumbar vertebræ. They are about 4 inches in length, and weigh 4 to 5 ounces each. The kidneys are invested by a thin, fibrous capsule, which is attached by connective tissue and blood-vessels. It is easily stripped off. On making a longitudinal section through a kidney the glandular structure will appear to be divided into two portions: (1) the outer or cortical portion, for the most part occupying the surface, except at the hilus; (2) the medullary portion, consisting of a number of pyramids separated from one another by cortical substance. (1) the cortical substance occupies the greater part of the gland, being 1/3 to ½ inch in depth at the surface, and extends into the center of the gland between the pyramids; the cortical portion between the pyramids being termed the columns of Bertini. It is of a light red color, and more or less distinctly striated in appearance, the striations being due to the interlobular vessels and bundles of straight tubes which pass from the base of the pyramids to the capsule. The Malpighian

bodies may be seen as reddish points, or sometimes standing out from the surface like grains of sand. The bundles of straight tubes are called the medullary rays. (2) The medullary portion occupies the center of the gland, and consists of eight to twelve of the pyramids of Malpighi. These pyramids are surrounded at their bases and sides by cortical substance, while their apices project into the dilated portion of the ureter at the hilus, which forms the pelvis. The pyramids are divided by Ludwig into two layers or zones—the boundary layer and the papillary layer. The boundary layer has well-marked striations, this appearance being due to the vasa recta, and to the bundles of tubules passing down the pyramid towards the papilla. The papillary layer is of a more uniform dull red color. The Malpighian bodies are about 1/120 inch in diameter, and are situated in the cortical portion between the medullary rays. They consist of a tuft of capillary vessels in a capsule formed by the dilated end of a urinary tubule. The tuft is termed the glomerulus, the membranous envelope Bowman's capsule. The glomerulus receives an arterial twig from an interlobular artery, and its efferent vein joins a plexus which surrounds the convoluted tube before joining an interlobular vein. Bowman's capsule consists of a homogeneous membrane, lined by flattened epithelium, and joins a convoluted tube by a constricted neck. The convoluted tubes commence as capsules in the cortex, twist upon themselves several times, then on joining a medullary ray, take nearly a straight course. They have a distinct lumen, and are lined by short columnar cells, narrower at the lumen than at the basement membrane. The outer part of the cell is distinctly striated; their inner part is granular. They have a well-marked nucleus. The convoluted tubule passes into a spiral tubule of Schachowa, which is situated in the medullary rays; these are more or less spirally arranged, the epithelium is the same as in the convoluted tubes. The spiral tubule on entering the boundary layer becomes narrower, and forms the descending loop-tube of Henle; the epithelium is here flattened, with a prominent nucleus. The ascending loop-tube, which has re-entered the boundary layer, is wider than the descending, and is lined by a layer of polyhedral fibrillated cells. It next enters the cortex, is somewhat narrower and wavy, and passes upwards in a medullary ray. It then leaves the medullary ray and forms an irregular tubule. Its shape is irregular, its lumen small, and its epithelium consists of short, columnar, fibrillated cells. The irregular tubule passes into the second convoluted tube, closely resembling the first convoluted tube. It then passes into a more or less wavy collecting tube before it joins a straight collecting tube.

The collecting tubes commence in the cortex and pass through the boundary layer into the papillary layer, are lined by columnar or cubical epithelium, and have a distinct lumen."—(Ashby's *Notes on Physiology.*)

4. "The *plcuræ* are two serous sacs enclosing and investing the lungs. Each pleura consists of a visceral and parietal layer. The *visceral* portion covers the lung, and the *parietal* layer lines the inner surface of the chest walls, the upper surface of the diaphragm, and the sides of the pericardium. The visceral and parietal layers of the corresponding pleura become continuous in front and behind the root of the lung; and below the root a fold, the *ligamentum latum pulmonis,* extends downwards along the inner surface of the lung to the diaphragm. The mediastina are formed by the visceral layers of each side approaching one another towards the median line.

"The limits of the parietal pleuræ are as follows: each extends upwards into the neck, forming a dome-like process over the apex of the lung about two inches above the first costal arch; from this the pleura passes downwards and forwards to the posterior aspect of the sterno-clavicular joint of each side and meets its fellow in the mid-line at the manubrio-gladiolar articulation; they pass down together to level of fourth costal cartilages, where *right pleura* passes vertically to level of seventh right costal cartilage in mid-line; then outwards, crossing ninth rib in mid-axillary line; then downwards and backwards along eleventh rib to reach spine at neck of twelfth rib. Behind, it passes upwards on right side of bodies of vertebræ to apex. At level of fourth costal cartilage the *left pleura* arches outwards, leaving uncovered part of anterior surface of pericardium, and lying about three-quarter inch from the margin of sternum, to reach seventh costal cartilage, where it follows same line as on right, but is placed at a slightly lower level."—(*Aids to Anatomy.*)

5. The *posterior tibial artery* is the continuation downward of the popliteal artery. It begins at the lower border of the popliteus muscle; it ends midway between the internal malleolus and the tuberosity of the os calcis, where it divides into the external and internal plantar arteries. Its *branches* are: Peroneal, nutrient, muscular, cutaneous, communicating, internal calcanean, and malleolar cutaneous. *Relationships. In front:* Tibialis posticus, flexor longus digitorum, tibia, and ankle joint. *Behind:* Skin, fascia, gastrocnemius, soleus, posterior tibial nerve, and abductor hallucis. *On inner side:* Posterior tibial nerve, at upper part. *On outer side:* Posterior tibial nerve, at lower part.

6. *Tibia* is the shin bone, or internal bone of leg, and extends from knee to ankle. It consists of a shaft and

upper and lower extremities. The shaft is triangular and prismatic in shape; its anterior border is subcutaneous, and forms the shin; on the posterior surface is an oblique line. The upper extremity is expanded, and presents the head, with two tuberosities, spinous process, tubercle, and popliteal notch. The lower extremity is quadrilateral, and from it projects the internal malleolus. It articulates with the fermur, the fibula, and astragalus. It has three points of ossification, one each for shaft, and upper and lower extremities.

7. In amputation of forearm at middle third there will be severed: Skin, fascia, supinator longus, extensor carpi radialis longior and brevior, extensor communis digitorum, extensor carpi ulnaris, supinator brevis, anconeus, pronator radii teres, flexor carpi radialis, palmaris longus, flexor sublimis digitorum, flexor carpi ulnaris, flexor profundus digitorum; arteries: anterior interosseus, radial, ulnar; veins: radial, interosseous, ulnar, median; nerves: posterior interosseous, radial, median, ulnar; bones: radius, ulna.

8. *Second cranial nerve. Origin,* from optic tract, which arises by two roots; *Outer,* from external geniculate body, optic thalamus and brachium of superior quadrigeminal body. *Inner,* from internal geniculate body. *Course:* Winds across outer and anterior surfaces of crus cerebri, uniting with fellow to form optic commissure, which is bounded in front by the lamina cinerea and behind by the tuber cinereum; the nerves separate at fore part of commissure, get ensheathed in arachnoid, and pass into orbit through optic foramen above and internal to ophthalmic artery; whilst passing through, each receives a tube of dura mater, which divides into two, the outer piece becoming orbital periosteum, and the inner, ensheathing the nerve, joins the sclerotic in front. The nerve pierces sclerotic and choroid coats of eyeball. *Distribution:* Expands to form retina.—(*Aids to Anatomy.*)

9. The ANTERIOR TRIANGLE OF THE NECK is *bounded:* In *front* by a line from the chin to the sternum; *behind* by the anterior margin of the sternomastoid; *base* is upward, and is formed by the lower border of the body of the lower jaw and a line from the angle of the jaw to the mastoid process. It is *divided* into three smaller triangles (inferior carotid, superior carotid, and submaxillary) by the digastric muscle and the anterior belly of the omohyoid. *Contents:* Thyroid gland, trachea, larynx, parotid and submaxillary glands. Arteries: Inferior thyroid, common carotid, internal carotid, external carotid, superior thyroid, lingual, facial, ascending pharyngeal, occipital, submental, and mylohyoid. *Veins:* Inferior thyroid, internal jugular, lingual, facial superior thyroid, pharyn-

geal, external jugular, and anterior jugular. *Nerves:* Pneumogastric, recurrent laryngeal, descendens noni, communicans noni, superior laryngeal, external laryngeal, spinal accessory hypoglossal, glossopharyngeal, mylohyoid, and sympathetic. Also lymphatic glands and vessels.

10. *The spinal column* is a flexible column formed by the superimposed vertebræ, and intervertebral substance. All vertebræ have a body or centrum, two pedicles, two laminæ, four articular processes, two transverse processes, and one spinal process. There are seven cervical vertebræ, twelve dorsal, five lumbar, five sacral, and four coccygeal. The sacral unite to form the sacrum, and the coccygeal the coccyx. The *cervical vertebræ* are the smallest, and have a foramen in the transverse process. The *thoracic vertebræ* have a heart-shaped body with a facet or demi-facet on each side for articulation with a rib; the laminæ are broad and deep; the spinous process is long and points downward; the transverse processes are long and articulate with the tubercle of a rib; the superior articular process is directed backward and slightly outward; the inferior articular process is directed forward and slightly inward; the spinal foramen is smaller and circular.

The dorsal vertebræ have a large body, wider transversely, and with no facet or demi-facet; the laminæ are short and thick; the spinous process is horizontal; the transverse processes are "rudimentary"; the superior articular process is directed inward and slightly backward; the inferior articular process is directed outward and slightly forward; the spinal foramen is larger, and triangular.

PHYSIOLOGY.

1. *Hydrocarbons* consist of carbon and hydrogen only; as a rule they are not used as food, and have no particular physiological action. The term was often used loosely to denote fats (containing carbon, hydrogen, and oxygen) whose function is to supply heat and energy, and to serve in the nutrition of the nervous system. *Albuminoids* are a miscellaneous collection of proteins which are neither albumins nor proteids; they are generally insoluble in the neutral solvent of the proteins; they are found in connective tissues, cartilage, bone, skin.

2. *Secretion of Gastric Juice:* "The stomach has two secretions, one thick, tenacious, and alkaline—the gastric mucus; the other, thin, acid, and watery—the gastric juice proper. The former is secreted during fasting, while the latter is only secreted when food or fluid enters the stomach. Saliva or alkalies, pepper, alcohol excite the secretion of gastric juice. Their action is reflex; the vagus

is probably the afferent nerve, which, acting on the medulla, inhibits the sympathetic and dilates the blood-vessels supplying the glands; the efferent impulses descending along the splanchnics."—(Ashby.)

The *constituents of gastric juice* are: Water, proteid, mucin, pepsin, rennin, hydrochloric acid, salts (sodium and potassium chlorides, and calcium and magnesium phosphates).

3. *The functions of the saliva* are: (1) To moisten the mouth, (2) to assist in the solution of the soluble portions of the food, and thus (3) to administer to the sense of taste, (4) to lubricate the bolus of food, and thus (5) to facilitate the acts of mastication and deglutition, and (6) to change starches into dextrin and sugar.

4. The *blood* is fluid, somewhat viscid, red, specific gravity from 1055 to 1062, alkaline reaction, saltish taste, characteristic odor, variable temperature (average about 100° F.). The *constituents* are plasma and corpuscles. The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteins, fat, and inorganic salts). The *white corpuscles* consist of water and solids (protein, leuconuclein, lecithin, histon, etc.).

5. The coagulation of the blood is due to the development in it of fibrin. In the plasma a proteid substance exists, called fibrinogen. From the colorless corpuscles a nucleoproteid is shed out, called prothrombin. By the action of calcium salts prothrombin is converted into fibrin ferment, or thrombin. Thrombin acts on fibrinogen in such a way that two new substances are formed; one of these is unimportant and remains in solution; the other is important, viz., fibrin, which entangles the corpuscles, and so forms the clot. Its usefulness is seen in the checking of hemorrhage.

6. *Composition of urine:* Water, urea, uric acid, hippuric acid, xanthin, hypoxanthin, creatin, creatinin, extractives; chlorides, sulphates and phosphates (of sodium and potassium); phosphates of magnesium and calcium; nitrogen, and carbon dioxide. Urea is the most important constituent.

7. The medulla is the seat of several special centers, the most important of which is probably the respiratory center.

"The respiratory center is in reality made up of two centers, one for each side, so that, although anatomically connected and ordinarily acting together, yet if one center is broken up, while the respiratory movements on that side cease, those on the other side continue. Besides this double character of the center, each half is made up of an *inspiratory* and an *expiratory* center. The respiratory center is both an *automatic* and a *reflex* center—*i. e.*, it

sends out *spontaneously* impulses which result in movements of the respiratory muscles, constituting its *automatism;* and it may also be excited reflexly, *i.e.* by impulses reaching it from without. Its reflex character is most marked, and it is doubtless as a reflex center that its function is ordinarily performed."—(*Raymond.*)

8. Olfactory neves; function is special sense of smell.

9. TRIFACIAL NERVE. *Origin:*—(1) *Superficial,* from the side of the pons varolii; (2) *Deep* (sensory root), from the medulla, and upper part of cord; (motor root) from floor of fourth ventricle, and side of the aqueduct of Sylvius.

Functions: First ophthalmic branch supplies sensation to conjunctiva and skin of upper eyelid, cornea, skin of forehead and nose, lachrymal glands, mucous membrane of nose. *Second, or superior maxillary branch,* supplies sensation to skin and conjunctiva of lower lid, nose, cheek, upper lip, upper teeth and alveolar processes, and palate. *Third, or inferior maxillary branch,* supplies sensation to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower teeth, lower lip, and skin of the lower part of the face. This branch, in addition, supplies motion to the muscles of mastication (masseter, temporal, external pterygoid, internal pterygoid), also mylohyoid and anterior belly of digastric.

10. *"The sympathetic nervous system consists of* (1) a series of ganglia connected together by a great ganglionic cord, the gangliated cord, extending from the base of the skull to the coccyx, one gangliated cord on each side of the middle line of the body, partly in front and partly on each side of the vertebral column; (2) of three great gangliated plexuses or aggregations of nerves and ganglia, situated in front of the spine in the thoracic, abdominal, and pelvic cavities respectively; (3) of smaller or terminal ganglia, situated in relation with the abdominal viscera; and (4) of numerous fibers."

Function: It has a controlling influence over the secretion of most of the glands, the lacrymal, the salivary, the sweat glands, the glands of the stomach and intestines, the liver, the kidney, etc.; it presides over the circulation by regulating the caliber of the blood-vessels and the action of the heart; it influences respiration; and, all involuntary muscles, those of the digestive apparatus, of the genitourinary system, of the hair follicles (pilomotor nerves), are under its control to a great extent.

CHEMISTRY.

1. Oxygen is the most abundant of the elements; it occurs free in the air, and in combination in very many substances. It is a colorless, odorless, tasteless gas, slightly

soluble in water, heavier than air, combines readily with all other elements except fluorine, supports combustion and respiration, and is necessary to animal life. It has a valence of two, atomic weight of 16, and molecular weight of 32.

2. POTASSIUM IODIDE. *Formula,* KI. *Preparation:* Saturate an aqueous solution of potassium hydroxide with iodine:

$$6KHO + 3I_2 = KIO_3 + 3H_2O + 5KI$$

3. *The four halogens* are: Fluorine, chlorine, bromine, and iodine. *Fluorine* is a very irritant, corrosive gas; it decomposes water, forming ozone and hydrofluoric acid; it attacks organic substances with vigor; it forms compounds with all other elements except oxygen. Valence one; atomic weight, 19. *Chlorine* is a greenish yellow gas, occurring only in combination. It has a penetrating odor, and is very irritating. It has a tendency to combine with other elements, sometimes with evolution of light and heat. In the presence of water it is an active bleaching and disinfecting agent. Valence, one; atomic weight, 35.5. *Bromine* is a dark, reddish-brown liquid, giving off an irritating vapor. It is only found in combination. It is somewhat similar to chlorine, but less active. Valence, one; atomic weight, 80. *Iodine* is found in combination; is a solid, volatile, its vapor has a violet color and peculiar odor; it is scaly, with metallic luster. It is somewhat similar to chlorine and bromine, but is less active. Valence, one; atomic weight, 127.

4. PHENIC ACID. *Formula:* C_6H_5OH. *Derived from* coal tar. *Used* as an antiseptic, disinfectant; as an application to burns, lupus; as an injection for leucorrhea and gonorrhea in the female; as an antipruritic. *Treatment for toxic dose: Externally,* alcohol; *internally,* sodium sulphate.

5. SULPHURIC ACID. *Formula:* H_2SO_4. *Obtained* by combustion of sulphur, and oxidation and hydration of the resulting sulphur dioxide, by vapor of nitric acid and water. *Toxic dose:* "One dram is the smallest dose reported fatal to an adult. One-half that quantity has caused the death of a child one year old. There is no doubt, however, that as small a quantity as two or three drops of the concentrated acid would prove permanently injurious, while it might not prove fatal. Recovery has taken place after four ounces when appropriate treatment has been given."—(Riley's *Toxicology.*)

Use in medicine: As a caustic for venereal sores and warts; internally, in serous diarrhea, cholera, acute lead poisoning, and for the night-sweats of phthisis.

BACTERIOLOGY.

1. "Diphtheria antitoxin is obtained from the horse, the

animal having been rendered artificially immune by repeated injections extending over a period of several months of gradually increasing quantities of the strongest diphtheria toxin. As the bacilli themselves are not injected, the horse does not become infected with diphtheria, but he gradually acquires a tolerance for the toxins of the disease and develops in his blood a substance (antitoxin) which has the power to neutralize those toxins. At the proper time, when it is thought that his blood has acquired the requisite degree of potency, the animal is bled, and the serum—the part of the blood containing the antitoxin—is carefully separated from the clot, filtered, and standardized. The last procedure is accomplished by determining the quantity of antitoxin serum required to offset the effects of the minimum quantity of toxin necessary to kill a guinea-pig in a definite time. The strength of the antitoxin is measured in units, a unit containing the amount of antitoxin required to save the life of a guinea-pig which has been injected with 100 fatal doses of toxin."—(Stevens' *Materia Medica.*)

2. The introduction into the body of the vaccine is supposed to bring about a reaction, which is evidenced by a marked increase in the bactericidal and agglutinative properties of the blood serum against the particular organism.

3. Smallpox, diphtheria, tuberculosis, bubonic plague, hydrophobia, cholera, typhoid; and it has also been tried in some other diseases.

4. *To stain the pneumococcus:* Spread a cover glass with a smear containing the bacteria, dry it, then fix it in a flame. It can then be stained for from five to ten minutes in Ehrlich's solution; it is then to be washed in water and afterwards immersed in Gram's solution for two or three minutes. It is then washed in 95 per cent. alcohol. While in the Gram's solution the specimen is very dark brown, but it becomes violet or blue again on application of the alcohol.

5. *To find tubercle bacilli in the urine:* The urine should be drawn by a catheter, with the utmost regard to cleanliness and asepsis (so as to exclude the smegma bacillus). The urine thus obtained must be centrifuged for a long time. Some of the sediment is placed on a slide with a small quantity of egg albumin; it is covered with some carbolfuchsin, and allowed to steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle

bacilli will appear as thin, red rods, while all other bacteria will appear blue.

PATHOLOGY.

1. *Aortic stenosis* is that condition in which the aortic orifice is narrowed, and so the full amount of blood cannot leave the left ventricle at each systole. It is often due to atheromatous disease of the aorta on the segment or ring of the valve. The cusps are thickened, distorted, adherent, or calcified. The valves are generally incompetent; the left ventricle becomes hypertrophied, later on we find relative insufficiency of the mitral valve, dilatation of left auricle, pulmonary engorgement, hypertrophy and dilatation of right ventricle, and general venous engorgement.

2. In *chronic parenchymatous nephritis*, "both degenerative and proliferative changes are seen. The tubular epithelium is always more or less affected, showing signs of cloudy swelling, fatty degeneration, desquamation, and disintegration, most marked in the convoluted tubules, but also present in the loops and collecting tubules. The distribution of these changes is usually patchy, giving rise to mottling of the cortex. The lumina of the tubes may be dilated, and contain granular and fatty matters, and hyaline casts, the latter formed by coagulation of exudation in the tubules. The glomeruli may occasionally appear normal, but there is almost always some swelling and hyaline degeneration, together with some proliferation and desquamation, of the epithelium, so that they become highly cellular. Occasionally the glomerular changes may be more marked than the tubular; fatty degeneration of the glomerular and capsular epithelium may be prominent, or there may be swelling, proliferation, and desquamation of the epithelium, or both these changes may be combined. The glomerular vessels may be compressed, their endothelium degenerate, and they may become obstructed by leucocytes or by hyaline thrombi, and finally obliterated. Intersitial changes, though present, are not conspicuous, and consist of edema, and scattered foci of round-celled infiltration about the glomeruli and veins. Sometimes hemorrhages are evident in some of the glomeruli and the corresponding tubules. Lardaceous infiltration frequently accompanies parenchymatous nephritis."

In *chronic interstitial nephritis*, "the lesions are principally seen in the cortex; at first patches of cellular infiltration appear, then the intertubular connective tissue becomes increased and fibrous, with destruction of glomeruli and the corresponding tubules. The glomerular epithelium becomes swollen and desquamates, Bowman's capsules may be much thickened by concentrically arranged layers of nucleated fibrous tissue, and the Malpighian

bodies in places may be converted into nodules of fibrous tissue, in others into cysts. The corresponding tubules undergo atrophy with disintegration of their epithelium; here and there multiplication, with convolution of the tubules, may be present, suggesting an adenomatous formation. There is everywhere an increase of the stroma, in the cortex and pyramids, between the tubules, and around the glomeruli and vessels, with pronounced round-celled infiltration or well formed fibrous tissue, in which calcification may occur. The vessel walls are thickened, chiefly owing to an endarteritis. Lardaceous infiltration may accompany the interstitial nephritis."—(Hewlett's *Pathology.*)

3. "The iris is congested, swollen, and infiltrated with round cells. There is an exudate of round cells, fibrin, and pigment cells, which fills the anterior chamber and glues the edge of the pupil and back of the iris to the anterior capsule of the lens."—(Alling and Griffin's *Epitome of the Eye and Ear.*)

4. The lesions are in the lower part of the large intestine; the wall is hyperemic and thickened; particularly the mucous coat, which is covered with bloody mucus. Necrosis and degeneration follow, with ulcers resulting. These ulcers contain amebæ, heal by cicatrization, and may produce strictures.

5. *Chronic gastritis:* Walls of stomach are thickened, mucous membrane is covered with thick mucus, especially near the pylorus; ecchymoses are common; the mucous membrane is also wrinkled.

THERAPEUTICS.

1. OPIUM. *Official preparations, with doses:* Powdered opium, gr. j; extract of opium, gr. ss; powder of ipecac and opium, gr. vijss; vinegar of opium, ℥viij; camphorated tincture of opium, ℥viij; deodorated tincture of opium, ℥viij; granulated opium, gr. jss; wine of opium, ℥viij; morphine, gr. 1/5; morphine sulphate, acetate, and hydrochloride, each gr. ¼; codeine, gr. ½; codeine sulphate and phosphate, each, gr. ½; apomorphine hydrochloride, gr. 1/10. *Therapeutic uses:* As an anodyne, in diarrhea, peritonitis, for internal hemorrhages, in mania and delirium tremens, in many respiratory affections, in diabetes, and to prevent or lessen shock.

2. COLCHICUM. *Physiological action:* It is a diuretic, causes irritation of the gastrointestinal tract, salivation, collapse, and increases the output of uric acid. *Therapeutic uses:* Chiefly used in gout; also in headache, dyspepsia, or neuralgia in gouty people.

3. BRYONIA. *Dose,* gr. x to lx. It is *used* as a hydragogue cathartic, in cases of dropsy or other serous effusions.

4. Precipitated calcium phosphate, gr. xv; syrup of calcium lactophosphate, 3ij. It is *used* in diseased conditions of the bones, rickets, mollities ossium, scrofula, anemic conditions, tuberculosis.

5. VERATRUM. *Dose,* gr. ij. *Uses:* As a circulatory depressant in pneumonia, in puerperal convulsions, tonsillitis, puerperal inflammations in general, mania, and as a rule very much as aconite.

6. IPECAC. *Dose,* gr. j as an expectorant; gr. xv as an emetic. *Action:* Hemostatic, expectorant, emetic, stomachic, cholagogue, and diaphoretic. *Uses:* As an emetic, to clear the respiratory passages, to relieve the stomach, in bronchitis, emphysema, dysentery and jaundice, and as a diaphoretic in rheumatism.

7. NUX VOMICA. *Officinal preparations:* Extract, gr. ¼; fluid extract, ♏j; and tincture of nux vomica, ♏x. Strychnine (with its sulphate and nitrate), each gr. 1/64. *Uses:* As a general tonic or bitter; in indigestion, cardiac depression, impaired peristalsis, pneumonia, phthisis, amenorrhea, dysmenorrhea, impotence, and urinary incontinence.

8. TARTAR EMETIC. *Dose,* gr. 1/10 as an expectorant, and gr. ½ as an emetic. *Indications:* In inflammatory affections of the respiratory tract, when the secretion of mucus is not free; in pneumonia, bronchopneumonia, colds, bronchitis, laryngitis, and tonsillitis.

9. ACONITE. *Dose:* Fluid extract, ♏j; tincture, ♏x. *Medicinal uses:* For fevers, some inflammatory conditions, in high arterial tension, in nervous palpitation of the heart, and congestive dysmenorrhea; also externally for neuralgia, pruritus, herpes, chilblains, etc.

10. CINCHONA. *Officinal preparations:* Fluid extract, ♏xv; tincture, 3j; compound tincture of cinchona, 3j. Quinine (with its sulphate, bisulphate, hydrobromide, hydrochloride, and salicylate), each gr. iv; cinchonine sulphate, gr. iv; cinchonidine sulphate, gr. iv. *Uses:* In malaria; as a tonic; in influenza, in dyspepsia, in asthma; as an antipyretic; and locally, for sores in diphtheria, and in hay fever.

PRACTICE.

1. *Variola* is an infectious contagious disease; the exciting cause has not been isolated. *The treatment* consists first in isolation, and disinfection of the bed linen, clothing, furniture, etc., by formalin, mercuric chlorid, or some other antiseptic solutions. All persons in the immediate vicinity should be vaccinated. Outside garments of the attendants should be such as can easily be disinfected, and the face, hands, and hair of such persons should be thoroughly scrubbed with mercuric chloride solution, care being taken to avoid injury to the eyes. Rest in bed is

essential, and fractional doses of calomel followed by a saline should begin the medical treatment. Potassium bitartrate (gr. 20 every 3 hours) may be given for its effect upon the kidneys, and antifebrin or phenacetin may be given for the fever. The diet should be light. The tub-bath may be necessary to reduce temperature. Whisky (℥½ every 3 hours) may be required if the heart becomes weak, and morphine (gr. ¼ hypodermically) may be used to control the pain. Pitting may be prevented by the application of cold-cream, vaselin, or lint soaked in mercuric chloride (1:3000 solution). Quarantine should be enforced for at least 2 weeks.

2. Methods of physical diagnosis are: Inspection, palpation, percussion, auscultation, mensuration, and weighing. *Inspection* shows the shape, size, symmetry, movements, and color of the chest. *Palpation* confirms and adds to what is learnt by inspection, shows areas of tenderness, condition of chest walls, presence of tumors, action of heart, and the existence and character of fremitus. *Percussion* shows the composition of structures or tissues, the resistance or elasticity of certain organs, and resonance of lungs. *Auscultation* enables one to study the condition of the heart and lungs.

3. *Lobar pneumonia* is caused by the diplococcus pneumoniæ. The first stage is characterized by sudden onset with chill, a sharp pain in the side, rise of temperature, a short and sharp cough, rusty-colored, viscid sputum, and dypsnea. There may be headache, insomnia, scanty urine with diminution of urea, chlorids, phosphates, and sulphates, insomnia, and herpetic vesicles on the face, and there is always an increase in the number of leukocytes in the blood. Physical examination will reveal diminished expansion, impairment of the normal percussion note, feeble or suppressed respiratory murmur, moist or dry râles, crepitation, and sometimes a pleural friction sound. In the second stage the dyspnea is more marked; the face is more or less livid in color; the temperature is high (104°-105° F.); and the pulse increases in rate (110-120), its tension and fulness lessening with the progress of the disease, and growing feeble and intermittent. Headache, delirium, and various other nervous symptoms may be present. Expansion is diminished and vocal fremitus is exaggerated upon the affected side. There is dulness with increased resistance over the consolidated lung, and ausculation detects bronchophony or bronchial breathing over this same area. The third stage is ushered in by a sudden drop of temperature on about the fifth or ninth day, followed by a natural sleep, free sweating, and relief from suffering. In this stage the crepitant râle (râle redux) is heard in the midst of the

bronchial breathing, together with numerous moist râles. Dulness may persist for some time, but usually by the twelfth or fourteenth day the lung has returned to its normal state.—(*Pocket Cyclopedia.*)

Treatment: "This consists in rest in bed, milk diet, and the administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice-bags or compresses wrung out of cold water (60°-70° F.) to the chest or by the use of the warm or cold wet-pack. The heat and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dypsnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease."—(*Pocket Cyclopedia.*)

4. The early manifestations of pulmonary tuberculosis are: (1) *Physical signs:* Deficient chest expansion, the phthisical chest, slight dullness or impaired resonance over one apex, fine moist râles at end of inspiration, expiration prolonged or high pitched, breathing interrupted. (2) *Symptoms:* General weakness, lassitude, dyspnea on exertion, pallor, anorexia, loss of weight, slight fever, and night sweats, hemoptysis.

Good hygiene, fresh air, sunshine, ventilation, moderate exercise, nutritious but easily digested food, avoidance of resorts favored by consumptives. Tonics and cod liver oil may be advisable.

5. Typhoid fever is caused by the bacillus typhosus of Eberth.

The *treatment of typhoid* "is largely supportive and prophylactic. On account of the wide distribution of the bacilli in the secretions, it is highly important that the excreta and all substances which come in contact with the patient should be thoroughly disinfected to prevent dissemination of the disease. Corrosive sublimate (1:500), carbolic acid (1:10), and chlorinated lime are used to disinfect the stools. Weaker solutions may be employed for sponging the perineum and anal region of the patient and for washing the hands of the attendants. The general treatment consists in absolute rest in bed with the enforced use of the bed-pan. The diet should be liquid, largely milk, and should be administered every 3 hours. Fever should be controlled by sponging, by the wet pack, and by the full bath. The Brand method consists in immersion of the body in a tub of water (70° F.) for 15 or 20 minutes

every third hour when the temperature rises above 102.5° F. The medicinal treatment includes the use of antipyretics, intestinal antiseptics, and antityphoid serum. Abdominal pain, tympanites, and tenderness are best treated with fomentations and turpentine stupes, while meteorism may be relieved by the internal administration of turpentine and by the use of the rectal tube. Diarrhea, when it exceeds 4 or 5 stools daily, will require the withholding of all food except milk and the administration of opium, bismuth, codein, naphthalin, etc. Constipation should be relieved every two days by enemas containing soapsuds. When hemorrhage occurs, the foot of the bed should be elevated, an ice-bag or iced cloth should be applied to the abdomen, morphine should be given hypodermically, and opium (gr. 1) should be administered by the mouth every three hours. Peritonitis usually terminates fatally, and requires the same treatment as hemorrhage. Abdominal section should be performed as soon as the diagnosis is positive. Alcohol, ammonia, strychnine, digitalis, etc., should be used if heart failure supervenes. Nervous symptoms are greatly lessened by hydrotherapy, but nerve-sedatives may be necessary. Sore mouth may be prevented by cleanliness and the use of carbolized glycerin solution (0.5 per cent.) upon the gums and teeth."—(*Pocket Cyclopedia.*)

6. *Acute bronchitis: Symptoms.*—The onset is rather sudden, and is marked by chilliness, hoarseness, distressing cough, sense of pain and constriction over the region of the sternum, slight fever (100° to 101° F.), and the expectoration of a viscid whitish secretion. As a rule, the objective symptoms are negative. Ausculation in the first stages yields dry râles (sonorous and sibilant) both during inspiration and expiration; later, when the mucus is more fluid, moist râles (mucous râles, small gurgling râles) may be heard with the respiratory murmur. Coughing may modify all kinds of râles. Respirations are normal.

Treatment: If the bowels are constipated or the tongue is coated, a purgative should be given at once. Free diaphoresis may be established by the use of hot foot-baths and hot lemonade on going to bed. The atmosphere of the room should be maintained at an even temperature—never below 65° F. or 70° F.—and a flannel jacket should be worn; mustard plasters may be applied to the chest. The diet should be liquid. Quinin (gr. 4) with Dover's powder (gr. 10) every 3 or 4 hours are indicated. Opium and its derivatives relieve the distressing cough.—(*Pocket Cyclopedia.*)

7. *Acute Bright's disease: Symptoms.*—The first evidence of the affection is the edematous condition of the face. This edema may extend and produce general anasarca. The urine

is scanty, smoky in color, and of a high specific gravity. It usually contains albumin, blood-cells, blood casts, epithelial casts, hyaline casts, and free renal epithelium. It may contain pus-cells and pus-casts, and in prolonged cases dark granular casts and dark granular cells are common. Retention of urine, uremia, intense itching of the skin, dyspnea, delusional insanity, and various palsies may occur in the course of the affection. The complications may be pleurisy, pneumonia, bronchitis, pulmonary edema, and hypertrophy of the left ventricle. The distinctive features of this form of kidney-disease are the history, the urinary characteristics, and the favorable prognosis under appropriate treatment.

The treatment consists largely in rest in bed, warmth, milk diet, and attempts at elimination of waste products. Free purgation should be secured by means of the salines, calomel, or compound jalap powder. Diaphoresis may be favored by the administration of sweet spirits of niter, and in severe cases, pilocarpin, and by the use of warm baths, warm applications, or the vapor bath. Tincture of digitalis (m5-20 every 4 hours), tincture of strophanthus, or spartein (gr. ¼-½) may be given as diuretics. Infusion of cream of tartar and juniper berries may be employed. The occurrence of uremia will require prompt and enegetic measures.

8. A *cataract* is an opacity of the crystalline lens or its capsule. *Treatment:* Extraction of the lens by operation is the only means of relieving a patient of senile cataract; discission is applicable only to cataracts of the young. No medicinal treatment, whether local or constitutional, is of curative value.

9. *Acute catarrhal otitis media* is frequently caused by acute coryza and the infectious fevers. There is a painless obstructed sensation in one or both ears, impairment of hearing, and tinnitus. The inflammation causes closure of the eustachian tube. Inflation and aspiration of the middle ear and syringing and douching the nares and nasopharynx must be avoided. A moderate spray of Dobell's solution may be used. If pain is present, dry heat, in the form of hot-water bottle, hot stone wrapped in flannel, etc., may be applied. A few drops (100), warmed, of a carbolic acid solution (1:40), or one of formalin (1:2000), may be instilled into the ear.

10. *Psoriasis* "is a common chronic inflammatory disease of the skin, characterized by variously sized lesions, having red bases, covered with white scales resembling mother-of-pearl. It affects by preference the extensor surface of the body. The lesions are infiltrated, elevated, clearly defined, covered with white, shining, easily detachable scales which, upon removal, reveal a red, punctuate, bleeding surface,

The eruption is absolutely dry, and itching is usually absent. *Treatment* consists in the internal administration of arsenic, codliver oil, oil of copaiba, or potassium iodid, and the use of local applications. The scales should be removed by soap and water, alkaline baths, or oily substances. Ointments containing salicylic acid (3 per cent. to 10 per cent.), tar (3ı to ʒı of ointment), ichthyol (3ı to ʒı), chrysarobin (gr. 10-60 to ʒı), ammoniated mercury (gr. 10-40 to ʒı), etc., are very beneficial, and should be used after the scales have been removed."—(Gould and Pyle's *Pocket Cyclopedia.*)

OBSTETRICS.

1. "The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contrasting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and, to confirm this fact, the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the hand, and changing their position from time to time. Having located the back and the extremities, the portion of the fetal ellipse presenting at the superior strait is next ascertained. The examiner now faces the woman's feet with the outstretched hands, the fingers parallel with and the middle finger over the center of Poupart's ligament into the pelvic cavity. If the head is presenting, it is felt as a hard, regular, round body, the greater mass of the occiput, the sharp point of the chin, and the groove between occiput and back being often distinguishable. At the same time, the density of the head, its compressibility, its approximate size, and its relative size to the pelvis may be learned." (Hirst, *Obstetrics.*)

2. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Treatment:* Stop the hemorrhage by vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

3. The *hand* is in a straight line with the forearm, the thumb is at right angles to the other fingers, and may be

bent across the palm. The *foot* is at right angles to the leg, the great toe cannot be altered in its relation to the other toes, the malleoli and os calcis may be felt.

The *knee* has two tuberosities with an intervening depression; the patella may also be felt. The *elbow* has three prominences (the olecranon process of the ulna and the two condyles of the humerus).

In *shoulder* cases (as distinguished from *vertex*) the tumor is unsymmetrical in shape, and is longer transversely or obliquely; the head can be felt in one iliac fossa, and the breech higher up in the flank of the opposite side.

In cases of *shoulder presentation*, if seen before labor, version should be performed to correct the malpresentation; in case of impaction a cesarean section is indicated; sometimes decapitation or embryotomy has been performed, but a cesarean section is preferable. Cases of shoulder presentation have been known to terminate spontaneously, but it is not advisable to rely on this possibility.

4. *Puerperal eclampsia* is an acute morbid condition, occurring during pregnancy, labor, or the puerperal state, and is characterized by tonic and clonic convulsions, which affect first the voluntary and then the involuntary muscles; there is total loss of consciousness, which tends either to coma or to sleep, and the condition may terminate in recovery or death. The *causes* may be: Uremia, albuminuria, imperfect elimination of carbon dioxide by the lungs, medicinal poisons, septic infection; predisposing causes are renal disease and imperfect elimination by the skin, bowels, and kidneys. *Prognosis* is serious to mother and child. *Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:* (1) Control the convulsions (by chloroform, veratrum, or chloral); (2) eliminate the poison or poisons which are presumed to cause the convulsions; (3) empty the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

5. *Chloroform* is used in labor to lessen suffering produced by labor pains; to lessen the pain attending obstetric operations; to relax the uterus when its rigid contraction interferes with version; to promote dilatation of the os uteri; to reduce excessive nervous excitement which may interfere with progress of early stage of labor; to relieve eclamptic convulsions and mania; in cases of uterine in-

version to relax the constricting cervix and so facilitate replacement; in bipolar version to lessen pain of introducing the hand into vagina; in precipitate labor to suspend action of voluntary muscles and retard delivery; in all cutting operations upon the abdomen; and sometimes in sewing up a lacerated perineum when many sutures are required.—(From King's *Obstetrics.*)

Dangers: It lesens the efficiency of the uterine contractions; it predisposes the postpartum hemorrhage; and, if given too freely, may be followed by headache, nausea, and vomiting.

Ergot should be used after the placenta is expelled, so as to secure uterine contractions. Before this period, the use of ergot is dangerous, the objections being: (1) That it may produce tetanic contractions of the uterus and so cause rupture of the uterus, death of the mother, or asphyxiation of the child; (2) that it increases the chances of lacerations of the cervix and perineum; (3) that it tends to cause retention of clots and membranes, etc.; and (4) that it retards the secretion of milk.

6. *Indications for the use of forceps are:* "1. *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. 2. *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. 3. *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior, (*b*) mento-anterior face, (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute.) 3. *Accidental complications:* Hemorrhage; prolapsus funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both."—(From Jewett's *Practice of Obstetrics.*)

Applications of forceps: "They should not be used when the os is undilated, when the head is not engaged, except in placenta prævia, when the membranes are unruptured, when the disproportion between the child's head and the parturient canal is too great, or in impossible positions and presentations. Before applying the instruments they should be sterilized, preferably by boiling; and the patient anesthetized and placed in the lithotomy position. Two fingers of the right hand are introduced into the vagina; the left blade of the forceps is then held almost perpendicularly by the left hand, with the tip of the blade opposite the vulva the tip is introduced into the vagina, passed along the floor toward the sacrum. The blade is rotated outward in its long axis in order to escape the promontory of the sacrum. The right blade is introduced in a similar manner. To facilitate locking, one of the blades

must be rotated forward. If the head occupies the right oblique diameter, as in L. O. A. and R. O. P. positions, the right blade must be rotated; if it occupies the left oblique diameter, the left blade must be rotated. Traction is made in the direction of the pelvic axis until the perineum is well distended. The perineum is then protected by one hand, while the face is swept over it by an upward movement of the forceps. In posterior positions it is necessary to remove the instruments after the head is drawn down to the pelvic floor; after anterior rotation is secured they may be reapplied. If the occiput rotates into the hollow of the sacrum the hands should be depressed as the face is swept out under the symphysis pubis."—(*Pocket Cyclopedia.*)

7. ***False labor pains*** are slight, occur before labor, do not cause dilatation of the os, do not produce a "show."

True labor pains gradually increase in frequency and severity, occur during labor, cause the os to dilate, produce a "show."

Labor is divided into three stages: The ***first stage*** begins with the commencement of labor, and ends with the complete dilatation of the os uteri. The ***second stage*** begins with a complete dilatation of the os uteri, and ends with the birth of the child. The ***third step*** immediately follows the second, and ends with the expulsion of the placenta and the beginning contraction of the uterus.

8. In asphyxia of the newborn, the child either does not breathe at all, or only very feebly. There are two forms: (1) *Asphyxia livida,* in which the child is cyanotic: the face and skin generally are of a dusky purple hue, the conjunctivæ are injected, and the eyes protrude. The cord pulsations are generally slow and full. (2) *Asyphyxia pallida,* in which the child is pale and generally relaxed; the surface is cold and the appearance anemic.

In the livid form cut the cord, allowing a dram or two of blood to escape. In asphyxia pallida it is well to press the blood from the cord toward the umbilicus. The child may be placed in a hot bath, its head supported, and a small quantity of cold water dashed over the chest. In the latter case friction should be made over the body as soon as the infant is removed from the water. (Landis.)

9. *Care of infant:* After the cord has been ligated and cut, the eyes should be cleansed with a saturated solution of boric acid, after which, if there is any vaginal discharge from the mother, 1 or 2 drops of a 1 per cent. solution of silver nitrate should be instilled in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100° F., carefully dried, and

the cord dusted with some antiseptic powder. Sponging should be practised for 10 days, after which a full tub-bath at 98° F. should be given daily for 6 months. The temperature may then be reduced to 95° F., and at the end of a year to 90° F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel, and dusting powders should be used to prevent chafing."—(Gould and Pyle's *Pocket Cyclopedia.*)

10. *At three months:* Softening of cervix, cessation of menstruation, changes in the breast, discoloration of vagina, morning sickness. (None of much value, except the first.)

At six months: Hearing the fetal heart sound, active movements of the fetus, umbilical or funic souffle, outlining the fetus in whole or in part by palpation; ballottement (all valuable and all positive except the last).

GYNECOLOGY.

1. *Vulvitis* is inflammation of the vulva. *Variety:* Catarrhal, follicular, venereal, diphtheritic, and phlegmonous. *Causes:* Trauma, infection, lack of cleanliness, gonorrhea, pressure, excessive intercourse, and threadworms. *Treatment:* Rest, thorough cleanliness, fomentations, and removal of cause.

2. *Vaginitis* is inflammation of the vagina. *Varieties:* Acute, chronic, primary, secondary, catarrhal, membranous, diphtheritic, gonorrheal, granular, emphysematous, and senile. *Causes:* Same as Vulvitis. *Treatment:* Same as Vulvitis, with addition of salines and anodynes.

3. ***Menstruation*** **is a periodical disturbance in the female characterized by a bloody mucous discharge from the uterine cavity; it lasts during the period of woman's sexual activity, but is temporarily suspended during pregnancy and early lactation.**

Disorders of menstruation include: (1) Premature or precocious menstruation; (2) protracted menstruation; (3) absence of menstruation (amenorrhea); (4) profuse menstruation (menorrhagia); (5) flow in between periods (metrorrhagia); (6) painful menstruation (dysmenorrhea); (7) vicarious menstruation; (8) regular intermenstrual pain.

AMENORRHEA is *physiological:* Before puberty, during pregnancy and early lactation, and after the menopause. It may also be due to: Absence or imperfect development of the generative organs; also to stenosis, obstructions, or atresia of the genital tract; also to operative removal of the uterus or its appendages. Other causative factors are: Acute infectious diseases, anemia, chlorosis, obesity, drug habits, alcoholism, overstudy, lack of exercise, exposure

to cold, and various emotional causes. *Treatment* consists in: (1) Removing the cause, if possible; (2) general treatment by means of proper hygiene, rest, diet, bathing, attention to the bowels, exercise, etc.; (3) drugs reputed to be emmenagogues, such as iron, manganese, aloes, strychnine, apiol, oxalic acid, savine, rue, and tansy.

COMMON CAUSES OF MENORRHAGIA. *Constitutional:* Purpura, scorbutus, hemophilia, hepatic cirrhosis, over indulgence in food and alcoholic drinks. *Local and Vascular:* Uterine congestion and displacement, endometritis, subinvolution, fibroids, and other tumors. COMMON CAUSES OF METRORRHAGIA. *Constitutional:* None. *Local and Vascular:* Disease of uterus or appendages, polyps, extrauterine gestation, the hemorrhages in connection with pregnancy.

TREATMENT OF BOTH: Remove the cause, if possible; treat abnormal conditions that are present; vaginal douches, tampons, and curettage have been recommended; also ergot, hamamelis, hydrastis, and viburnum prunifolium; rest in bed is necessary. Intrauterine applications of astringents or of adrenalin have been used.

DYSMENORRHEA. *Causes:* Pelvic congestion, pelvic inflammation, malnutrition, overwork, lack of development, neuralgia, stenosis or obstruction of the cervix, prolapse or displacement of the uterus. *Treatment:* If possible, remove cause; attend to the general condition, hygiene, tonics, regular habits, etc.; curettage may be necessary, and may have to be repeated (perhaps more than once).

4. METRITIS is inflammation of the body or parenchyma of the uterus. *Varieties:* Acute, chronic, hemorrhagic, catarrhal, suppurative, granular, ulcerative (and also according to etiology). *Causes:* Wounds, injuries, operations, gonorrhea, septic infection, puerperal sepsis, cold during menstruation, intrauterine medication, and manipulations. *Treatment:* Remove the cause, if possible, prevention of sepsis, rest in bed, anodynes, hot vaginal douche, tampons with glycerin, iodin applications, suppository of opium and belladonna, dilatation, curettage, cauterization, irrigation, drainage, etc.

5. In the case of *polypus*, the body and fundus of the uterus are in their normal position in the abdomen, a sound can be passed into the uterus, the uterine and cervical canals are not obliterated, the polypus does not bleed easily, and is not particularly sensible to pain. The *inverted uterus* shows: Absence of body and fundus from normal position, will not permit passage of a sound into uterine cavity, the uterine and cervical canals are absent, the inverted uterus tends to bleed easily, and is very sensible to pain. In *prolapse* the largest part of the tumor is above; the opening of the Fallopian tubes cannot be seen; a sound can be passed into the uterine cavity.

I. SURGERY.

TUMOR OF BRAIN.	ABSCESS OF BRAIN.
1. No primary focus of infection but often history of syphilis or malignant disease of other organs.	1. Suppurating area in ear, nose, pharynx, scalp, or lung abscess.
2. Very slow development.	2. More rapid.
3. More definite focal symptoms.	3. Focal symptoms often present, but not so definitely localized as in tumor.
4. No rigors or septic symptoms.	4. Often begins with chills, septic symptoms often continue.
5. Temperature normal or slightly and irregularly elevated.	5. Temperature subnormal, other times higher—pus temperature.
6. Pulse slow.	6. Not slow as a rule.
7. Constant headache.	7. Not a constant or prominent symptom.
8. Projectile vomiting frequently present.	8. Not often; vomiting, if present, more frequent and not projectile.
9. General symptoms of pressure progressive.	9. When present, they vary greatly in intensity.
10. Choked disc constant.	10. Not constant.

—(Eisendrath.)

2. Bassini's operation is as follows: An incision, parallel with and below Poupart's ligament, is made over the sac, which is treated as in inguinal hernia. Poupart's ligament is then sutured to the pectineal fascia, to close the internal ring, and the plica falciformis of the fascia lata is sutured to the pectineal fascia, thus closing the canal. Care should be taken not to injure or compress the femoral vein.

3. OSTEOMYELITIS. *Symptoms:* Sudden onset; pain, tenderness, fever, chills, swelling of soft parts, sometimes the joint can be moved gently without pain; septicemia or pyemia may be present.

Treatment consists in relieving the constitutional symptoms and preventing the bone from necrosing. An incision down to the bone is made; if pus is beneath the periosteum, the latter is also incised; a piece of bone is removed by chisel or trephine, pus is removed, the endosteum is hurt as little as possible, the wound is irrigated with hot bichloride solution and packed with gauze; the soft parts are closed and the wound well drained. In case this fails, amputation may be necessary.

4. *Gastric ulcer* is generally caused by injury or bacteria, is most apt to occur between the ages of twenty and forty-five; after eating there is pain localized in the stomach, vomiting occurs soon after eating, hematemesis is common, there is localized tenderness over the stomach, and examination of the gastric contents show an excess of free HCl.

Gastric cancer does not usually occur before forty years of age, is more common in males, pain is localized and constant, vomiting is copious and occurs some time after eating; the vomitus contains "coffee ground" material; hemorrhages are common; a tumor may be palpated, and examination of the gastric contents shows absence of free HCl and presence of lactic acid; severe anemia and cachexia are also present.

5. Protect the wound from infection; if the bullet is superficial or doing mischief it must be found and removed; bleeding must be checked, and the wound dressed.

6. *Signs and symptoms of tuberculosis of the kidney: Pain:* Slight at first; severe later; attacks of colic from blocked ureter; some tenderness on palpation. *Tumor:* Moderate size, often due to perinephritis; ballottement well marked; may be lobulated. *Urine:* Polyuria; acid: pyuria and hematuria; urea and phosphates diminished; great variations due to blocking ureter. *Pyuria:* Dirty grey pus in small quantity; mixed with caseous masses and phosphatic débris. *Hematuria:* Very constant symptom; slight in amount; sometimes clots moulded in ureter. *Bacilli:* Tubercle bacillus in small numbers and difficult of detection. Septic organisms become abundant late in the disease. Absence of other organisms in acid purulent urine points to tubercle. *Cystoscopy:* Ureteral orifice is red, with pouting, swollen lips, or retracted. Methylene blue given as a hypodermic is not excreted, or excreted very slowly, by the diseased kidney. *Per rectum or vaginam:* The thickened ureter may sometimes be felt. *Albuminuria:* Always present when pelvis is diseased. *Polyuria:* Very marked, especially at night. *Dysuria:* Pain in neck of bladder. The earliest symptoms. Sometimes due to phosphatic débris in bladder. *Constitutional.*—Evening temperature raised to 100°-101° F.; if secondary sepsis has occurred, to 103°-104° F. Loss of flesh. Anemia. Rigors and sweats in last stage.—(Grove's *Synopsis of Surgery.*)

7. *Tuberculosis of the hip* is characterized by: Muscular spasm, lameness, shortening, atrophy, and swelling. In *congenital dislocation* there is a history of limp since the child began to walk; the trochanter is above Nelaton's line; there is no muscular stiffness, and no limitation of motion at the hip joint.

8. *Fracture about elbow joint:* "Thoroughly set the fracture while the patient is under ether. It is advisable, when it can be done conveniently, to use the *x*-rays to confirm the diagnosis and to use them again after dressings have been applied, to be sure that the bones remain in good position. If swelling is very great, it may be necessary to delay setting for two or even three days, the arm being bandaged and laid upon a pillow or lightly supported on an anterior angular splint during the waiting period. In all cases except transverse fracture above the condyles reduction is best effected by drawing upon the forearm, supinating it, extending it, and then bending it slowly into a position of acute flexion, the degree of flexion being in inverse ratio to the amount of swelling. In transverse fracture above the condyles reduction is effected by drawing the forearm and the lower fragment downward and forward and at the same time pushing the upper fragment back. Some surgeons advocate dressing the fracture on an anterior angular splint, the forearm being fully supinated. The advantage claimed for this splint is that if ankylosis occurs the joint is in a position to be useful, which it is not if ankylosed in extension."—(DaCosta's *Surgery.*)

9. *Acute intussusception* is most common in children. It begins suddenly with severe abdominal pain and vomiting. Blood-stained mucus is passed, perhaps with tenesmus. Collapse soon comes on, and may be fatal in twenty-four hours; otherwise death occurs in a few days from peritonitis. In most cases a "sausage-shaped" tumor can be felt, usually along the course of the colon, but lower down, or just above the pubis. The right iliac fossa feels empty. A natural cure may follow, but rarely, from sloughing of the intussusceptum, whilst the peritoneal cavity is protected by adhesions uniting the entering and ensheathing layers.

10. There are several operations, each of which has advocates. The *perineal* route might be advisable when the prostate bulges toward the rectum and perineum; the *suprapubic* route when there is something else to be done within the bladder, such as the removal of calculus. The *suprapubic* is the routine method; the *perineal* is said to give less shock, but better drainage, and at the same time to be more liable to leave a permanent fistula.

HYGIENE.

1. OPHTHALMIA NEONATORUM. *Etiology:* It is due to the gonococcus or some other pyogenic germ; and is produced by contact of the eye with the vaginal secretion of the mother during labor, or infected fingers, or instruments, etc.

Prophylaxis: Whenever there is the possibility of infection, or in every case, wash the eyelids of the new-born child with clean warm water, and drop on the cornea of each eye one drop of a 1 or 2 per cent. solution of nitrate of silver, immediately after birth.

2. *Cholera infantum* is due to some micro-organism or its toxine, not yet isolated, but hot weather, improper food, and bad hygiene are predisposing factors. Babies should be breast fed when possible; for others, the utmost care must be taken with the milk, bottles and rubber nipples; absolute cleanliness is essential. Plenty of water to sip; washing out of intestines, and of stomach, and the withholding of food are all necessary if the child gets the disease.

3. Three infections *through air:* Tuberculosis, influenza, measles; *through water:* typhoid, cholera, dysentery; *through food:* typhoid, tuberculosis, beriberi; *through insects:* Bubonic plague, malaria, yellow fever.

4.

	INCUBATION PERIOD	QUARANTINE PERIOD
Smallpox	8 to 14 days.	16 days.
Scarlatina	2 to 7 days.	10 days.
Diphtheria	3 to 5 days.	12 days.
Measles	10 to 16 days.	16 days.

5. "The methods used *in the production of antitoxins* were introduced by Behring, who found that by injecting susceptible animals with increasing amounts of extracellular toxin he produced in the blood serum of the injected animal certain changes which made the serum capable of counteracting the same toxin when injected into other animals. . . . In practice, the bacilli are cultivated in bouillon. The cultures are freed from all living bacilli by filtration. The liquid filtrate contains the toxin. This filtrate is injected into healthy susceptible animals, in increasing doses. Usually the horse is used, since large quantities of blood can be drawn from this animal on account of its size, and, moreover, the horse is very susceptible. . . . Eventually enormous doses of toxin are given, and the animal acquires a high degree of immunity. The blood of the animal is withdrawn, taking care to avoid contamination, and the serum allowed to separate in the refrigerator. The serum of the blood is drawn off and constitutes the antitoxin."—(Williams' *Bacteriology.*)

And see above, BACTERIOLOGY, 1, 2, and 3.

MEDICAL JURISPRUDENCE.

1. In *cerebral concussion:* There is sudden onset; pulse

is slow and weak; respirations are shallow, slight, and irregular; there is functional paralysis; and incontinence of urine and feces. In *intoxication* there is gradual onset; full pulse; respirations deep and slightly stertorous; twitching of muscles; no incontinence; the face is flushed, and the odor of alcohol may be on the breath. *Note:* The two conditions may be coincident.

2. A *recent cerebral hemorrhage* has a red color, the coagulum is not very firm. *Later* the color becomes brownish, the coagulum is firmer and more fibrous, and more adherent to brain and dura.

3. Malpractice is a failure on the part of a medical practitioner to use such skill, care, and judgment in the treatment of a patient as the law requires; and thereby the patient suffers damage. If due to negligence only, it is *civil* malpractice. But if done deliberately, or wrongfully, or if gross carelessness or neglect have been shown, or if some illegal operation (such as criminal abortion) be performed, it is *criminal malpractice.*

4. DROWNING. *Homicide:* Rare, except in case of infants; there are probably marks of violence on the body, not due to post-mortem factors. *Suicide:* Very common, and when there were motives to suicide, or tendency to the same, suicide would be suspected; as a rule there would be no witnesses. *Accident:* Very common; often witnesses present; proximity of precipice or other dangerous place would suggest accident. It is often impossible to differentiate the three conditions.

5. HANGING: The presumption is in favor of *suicide;* but evidences of great external violence and marks of a struggle or signs of fingers about the throat would point to *homicide;* a position of the body (with hands and feet tied), in which the patient *could not* have put himself, would point to *homicide. Accidental hanging* is rare, and occurs chiefly among children, while playing.

6. *Personal identity* is based on: Deformities, tattoo marks, scars, general appearance, actions, voice, manner of speech, apparent age, figure, size, gait, dress, moles, birth-marks, professional stigmata, handwriting, finger impressions, foot prints, examination of hair, condition of the teeth, color of hair and eyes.

STATE BOARD EXAMINATION QUESTIONS.

NEBRASKA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. What arteries unite to form the basilar artery?

2. What arteries, muscles, and nerves would be severed in a cross section at the middle of the humerus?

3. Describe the ulnar artery.
4. Where does the abdominal aorta commence and where does it terminate?
5. Describe the trachea.
6. Name the bones that form the ankle joint, and give their relations.
7. Name the abdominal viscera (*a*) wholly covered with peritoneum; (*b*) those partially covered.
8. Name the regions of the abdomen by diagram.
9. Name five muscles of the back of the leg.
10. Give the origin and insertion and blood and nerve supply of the humeral biceps muscle.

PHYSIOLOGY.

1. What is meant by the term blood pressure?
2. What part of digestion takes place in the duodenum?
3. Describe the pneumogastric nerve, and give its functions.
4. Describe the heart cycle.
5. How is the heat of the body maintained?
6. How are nitrogenous foods digested?
7. Give brief description of special nerve of hearing.
8. Name ductless glands, and give functions of each.
9. What is a carbohydrate?
10. What ferments enter into the digestion of carbohydrate?

CHEMISTRY.

1. Give the chemical name for H_3BO_3; $CHCl_3$; C_6H_5OH; $PbC_2H_3O_2$; $KHCO_3$.
2. How is glycerin obtained, and give its chemical formula.
3. What is the chemical basis of the acidity of normal urine?
4. Describe a test for sugar in the urine. Give a test for bile pigment in urine. What is the normal amount of urea excreted by an adult in 24 hours?
5. Describe oxygen; give its symbol, valence, and atomic weight; tell how to make it.
6. Give symptoms and treatment of poisoning by acetanilide.
7. What is a gas? Laughing gas? Marsh gas? Sewer gas?
8. Name six metals and six non-metallic elements, and the symbol for each.
9. Define oxidation and combustion, and give practical examples of each.
10. Why is a salt of mercury incompatible with potassium iodide?
11. From what sources may chronic lead poisoning come? Give treatment.

12. What are ptomains? Give symptoms and treatment of ptomain poisoning.

Only 10 *to be answered.*

MATERIA MEDICA AND THERAPEUTICS.

1. Define analgesic, anesthetic, hypnotic, and give examples.
2. How does atropine affect the function of (*a*) the eye, (*b*) the heart, (*c*) the intestines, (*d*) the skin? Tell manner of action in each case.
3. What are anthelmintics? Name four, with preparation and dose.
4. Name five official bromides and gives their physiological action.
5. What drug would you use as (*a*) a mydriatic, (*b*) expectorant, (*c*) anodyne, (*d*) escharotic, (*e*) styptic?
6. Give the effect of alcohol on (*a*) the brain, (*b*) the heart, (*c*) the kidneys.
7. Name three drugs that lower temperature, and tell how each does it.
8. Give the source and therapeutic uses of ichthyol and adeps lanæ.
9. Explain the action on the bowel of (*a*) opium, (*b*) thymol, (*c*) bismuth subnitrate.
10. How do saline cathartics produce purgation?
11. What is an alkaloid, a tincture, a fluid extract? Give an example of each.
12. For what purpose and in what doses would you administer (*a*) strychnine, (*b*) calomel, (*c*) tincture of aconite, (*d*) hyoscine, (*e*) potassium iodide?

Only 10 *to be answered.*

PATHOLOGY.

1. What causes rise of temperature?
2. Define hypertrophy; atrophy; give varieties and causes.
3. Give differences between degeneration and necrosis.
4. Give pathology of trachoma.
5. Define gangrene; name the types and give conditions determining each.
6. Describe briefly the reparative process of a fracture.
7. Describe the lesions of typhoid fever, and give distribution of the typhoid bacillus.
8. What forms of appendicitis are usually considered, and describe the structural changes which take place.
9. Define cretinism.
10. Give the pathology of inflammation.

PRACTICE OF MEDICINE.

1. Differentiate between cerebrospinal meningitis and anterior poliomyelitis.

2. Give cause of rickets, diagnosis and treatment.
3. Give urinary findings in parenchymatous nephritis and interstitial nephritis.
4. Differentiate between appendicitis and typhoid fever.
5. In what diseases will the microscope aid us most in diagnosis?
6. Describe the normal heart sounds.
7. Give differential diagnosis of acute glaucoma and acute iritis, and give treatment of each.
8. Give comparative table of contents of cow's milk and woman's milk, and how would you modify cow's milk so that it would compare with mother's milk for a baby six weeks old?
9. What are the symptoms and treatment of catarrhal jaundice?
10. Give cause, symptoms, and treatment of stomatitis.

OBSTETRICS.

1. Give signs of pregnancy.
2. Describe the management of labor in breech presentation.
3. When does the foramen ovale close?
4. Name some of the diseases of pregnancy.
5. Name the varieties of ectopic pregnancy.
6. Define prolapsis uteri. Give pathology, etiology, and treatment.
7. Give some causes and treatment of pruritus vulvæ.
8. What is the difference between menorrhagia and metrorrhagia, and give treatment for both.
9. What is the difference between vaginitis and vaginismus? Give treatment for each.
10. Give etiology and treatment of subinvolution of the uterus.

SURGERY.

1. Define septicemia, and give its causes.
2. How can the danger of ankylosis be averted after injury to a joint?
3. How would you arrest epistaxis?
4. Outline the principle of treatment for a compound dislocation.
5. Give the dislocations of the knee-joint and a method of reduction of any one.
6. What are the indications for trephining in fractures of the skull?
7. How are wounds classified?
8. How would you proceed surgically to remove the fluid in a case of ascites?
9. Give the indications for the removal of the mammary gland.
10. What are the chief surgical diseases of the groin?

NEBRASKA.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Nebraska State Board of Medical Examiners.

ANATOMY.

1. **The two vertebral arteries.**

2. In a cross-section at middle of humerus, will be severed: *Muscles:* biceps, coraco-brachialis, brachialis anticus, triceps; *arteries:* brachial, superior profunda, inferior profunda; *nerves:* median, ulnar, musculo-spiral, internal cutaneous, musculo-cutaneous.

3. The *ulnar artery* is a terminal branch of the brachial, begins a little below the bend of the elbow, and crosses obliquely to the inner side of the forearm; at the lower half of the forearm it runs along the ulnar border to the wrist, crosses the annular ligament, and enters into the palmar arches. The median nerve is in front of it, the ulnar nerve to the inner side. The superficial flexor muscles are also in front of it, the brachialis anticus and flexor profundus digitorum behind it; the flexor carpi ulnaris to the inner side; and the flexor sublimis digitorum to the outer side.

4. The abdominal aorta *commences* at the aortic opening in the diaphragm and *terminates* on the body of the fourth lumbar vertebra, where it bifurcates into the two common iliac arteries.

The *trachea* extends from the lower border of the larynx (opposite the lower border of 5th cervical vetebra) to the level of the disc between the 4th and 5th dorsal vertebræ, there dividing into the two bronchi. In length it measures 4½ inches.

Relations in the Neck.

IN FRONT.	LATERALLY.
Skin.	Cervical fascia.
Superficial and deep fasciæ.	Common carotid artery.
Anastomosis of anterior jugular veins.	Lateral lobe of thyroid gland.
Sterno-thyroid } Muscles.	Inferior thyroid artery.
Sterno-hyoid }	Recurrent laryngeal nerve.
Isthmus of thyroid gland.	BEHIND.
Inferior thyroid veins.	Esophagus.

In the Thorax.

Inclines a little to the left side.

IN FRONT.
First piece of sternum.
Origin of sterno-mastoid.
Origins of sterno-thyroid and sterno-hyoid.
Remains of thymus gland.
Left innominate vein.
Commencements of innominate and left carotid arteries.
Arch of aorta.
Deep cardiac plexus.

POSTERIORLY.
Esophagus.

RIGHT SIDE.
Right pneumogastric nerve.
Innominate artery.
Pleura.

LEFT SIDE.
Left cardiac nerves.
Left pneumogastric nerve.
Left recurrent laryngeal nerve.
Aortic arch.
Left subclavian artery.
Pleura.

The *cartilages*, from sixteen to twenty in number, are U-shaped, the anterior ⅔ or convex part being cartilage, the posterior ⅓ fibrous membrane.—(*Aids to Anatomy.*)

6. **The ankle joint is formed by the lower end of the tibia and its malleolus, and the external malleolus of the fibula, which together form a mortise above to receive the upper convex part of the astragalus and its two lateral facets.**

7. (*a*) ***Wholly covered with peritoneum:*** **Stomach, first part of duodenum, jejunum, ileum, cecum, transverse colon, sigmoid flexure, first part of rectum, liver.**
(*b*) ***Partially covered with peritoneum:*** **Second and third part of duodenum, ascending and descending colon. middle part of rectum, bladder.**

8. The regions of the abdomen and their contents are shown in the following table. It is to be remembered that the contents will vary according to the position of the lines drawn; these are arbitrary, and nearly every writer differs from every other. In the following table the superior horizontal line extends between the cartilaginous ends of the tenth ribs, the interior between the anterior superior iliac spines. The vertical lines pass upward from the iliopectineal eminences, at right angles to the upper horizontal line.

The viscera situated in each region are as follows:

RIGHT HYPOCHONDRIAC.	EPIGASTRIC.	LEFT HYPOCHONDRIAC.
Liver.	Liver.	Stomach.
Right kidney.	Stomach.	Spleen.
Hepatic flexure of the colon.	Gall-bladder.	Left kidney.
	Duodenum.	Splenic flexure of the colon.
	Pancreas.	

RIGHT LUMBAR.	UMBILICAL.	LEFT LUMBAR.
Right kidney.	Transverse colon.	Small part of left kidney.
Ascending colon.	Duodenum and small intestines.	Descending colon.
Ileum.	Great omentum.	Small intestines.
RIGHT ILIAC.	**HYPOGASTRIC.**	**LEFT ILIAC.**
Cecum.	Small intestines.	Sigmoid colon.
Appendix.	Bladder in children.	Small intestines.
Last coil of ileum.	Distended bladder in adults.	
	Pregnant uterus.	
	Sigmoid colon.	

9. Gastrocnemius, soleus, flexor longus digitorum, tibialis posticus, and flexor longus hallucis.

10. BICEPS. *Origin:* Short head, from coracoid process of scapula; long head, from upper margin of glenoid cavity. *Insertion:* Back part of tuberosity of radius. *Blood supply:* From brachial artery. *Nerve supply:* Musculocutaneous.

PHYSIOLOGY.

1. By the term *blood pressure* is meant the pressure on the blood due to (1) the ventricular systole, (2) the elasticity of the walls of the arteries, and (3) the resistance in the capillaries.

2. In the *duodenum*, proteids, fats, and starches are digested.

3. PNEUMOGASTRIC NERVE. *Superficial origin:* Groove between restiform and olivary bodies. *Deep origin:* Nuclei in floor of fourth ventricle. *Course:* Outward across the flocculus, to jugular foramen through which it passes, here it is joined by the accessory portion of the spinal accessory nerve. As it goes down the neck it lies in front of the *rectus capitis anticus* major and longus colli muscles. It passes in the carotid sheath behind and between the artery and vein. In the thorax the nerve on each side runs a different course. The *right* passes between the subclavian artery and vein, by side of trachea to root of lung, behind esophagus, through esophageal opening in diaphragm to posterior surface of stomach. The *left* passes between the subclavian and carotid arteries, in front of arch of aorta to root of lung, along anterior surface of esophagus, through diaphragm, to anterior surface of stomach. *Distribution* is shown by the names of the branches: Meningeal, auricular, pharyngeal, superior and inferior laryngeal, cardiac, pulmonary, esophageal, and gastric.

Functions: "Throughout its whole course the vagus contains both sensory and motor fibers. To summarize the many functions of this nerve . . . it may be said that it supplies (1) *motor* influence to the pharynx and esophagus, stomach, and intestines, to the larynx, trachea, bronchi, and lungs; (2) *sensory* and, in part, (3) vasomotor influence to the same regions; (4) *inhibitory* influence to the *heart;* (5) *inhibitory* afferent impulses to the *vasomotor center;* (6) *excito-secretory* to the salivary glands; (7) *excito-motor* in coughing, vomiting, etc."—(Kirkes' *Physiology.*)

4. The *heart cycle* includes all the changes which occur between the commencement of one heart beat and the commencement of the next; it consists of the alternate contractions (or systole) and relaxations (or diastole) of the auricles and ventricles of the heart. The contraction of the two auricles takes place simultaneously, and is followed by the simultaneous contraction of the two ventricles; then follows a period during which the whole heart is in a state of diastole. The cycle then begins again with the auricular systole.

5. The heat of the body is *maintained* by the thermotactic centers in the brain and cord keeping an equilibrium between the heat gained or produced in the body and the heat lost. *Heat is produced in the body by*: (1) Muscular action; (2) the action of the glands, chiefly of the liver; (3) the food and drink ingested; (4) the brain; (5) the heart; and (6) the thermogenetic centers in the brain, pons, medulla, and spinal cord. *Heat is given off from the body* by: (1) The skin, through evaporation, radiation, and conduction; (2) the expired air; (3) the excretions—urine and feces.

6. Nitrogenous foods are digested in the stomach by the pepsin of the gastric juice, and in the small intestine by the trypsin of the pancreatic juice.

7. The AUDITORY NERVE. *Origin—Superficial:* between pons and restiform body, floor of the 4th ventricle, by the lineæ transversæ. *Deep—upper root;* lateral angle of 4th ventricle; *lower root:* inner auditory nucleus. *Course.*—Passes round restiform body, from which it receives some fibers, to posterior border of crus cerebelli with facial; it then enters the internal auditory meatus with the facial nerve, the latter lying in a groove on its upper surface, and divides at the bottom into *cochlear* and *vestibular* branches. *Distribution.—Cochlear,* enters foramen spiralis and supplies cochlea and posterior semicircular canal; *vestibular,* to vestibule and superior and external semicircular canals.—(*Aids to Anatomy.*)

8. The *ductless* glands are: The spleen, thymus, thyroid, parathyroids, suprarenals, carotid, cocygeal, pituitary, and

pineal glands. The *function of the spleen:* The following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blood corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin. The *function of the thymus* is not settled; it is said: (1) To be a blood forming organ; (2) to have influence on growth and nutrition; (3) in hibernating animals it is supposed to store up materials which can be utilized during the period of inactivity. The *function of the thyroid* is not definitely settled; (1) it has some trophic function; (2) it is supposed to antagonize toxic substances; (3) it produces an internal secretion. The *function of the suprarenals* is not definitely settled; they produce an internal secretion which is probably necessary to life; it is supposed that they are able to destroy or remove some toxic substance produced elsewhere in the body. The *function* of the *other* ductless glands is unknown. They all, or nearly all, furnish an internal secretion.

9. *Carbohydrates* were formerly defined as substances of unknown constitution, consisting of carbon, hydrogen, and oxygen; there being in the molecule six (or some multiple of six) atoms of carbon, and the hydrogen and oxygen being in the proportion to form water.

10. Ptyalin and Amylopsin.

CHEMISTRY.

1. H_3BO_3 is boric acid; $CHCl_3$ is trichlormethane (chloroform); C_6H_5OH is phenol; $Pb(C_2H_3O_2)_2$ is lead acetate; $KHCO_3$ is monopotassic carbonate.

2. Glycerin is obtained by decomposing glyceryl stearate by superheated steam. The *formula* is $C_3H_5(OH)_3$.

3. The acidity of the urine is due to acid sodium phosphate, NaH_2PO_4.

4. Test for *sugar:* Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test tubes. To one test tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color. Test for *bile pigment:* Put 3 c.c. HNO_3 in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquids, which gradually

rises, and is succeeded from below by blue, reddish-violet, and yellow.

The normal amount of urea excreted in 24 hours is about 500 grains.

5. Oxygen is colorless, odorless, tasteless gas; it is sparingly soluble in water; it has a strong tendency to enter into combination with other elements; it is necessary for respiration, and is both combustible and a supporter of combustion. Its *Symbol* is O; *valence*, 2; *atomic weight*, 16; it is made by heating potassium chlorate:

$$2KClO_3 + \text{heat} = 2KCl + 3O_2.$$

6. *Symptoms of acetanilid poisoning:* Chilliness, cold sweat; nausea; pulse is soft, slow, and feeble; respirations slow and shallow. *Treatment:* Lavage, diffusible stimulants, application of heat, coffee or strychnine, inhalation of oxygen, or saline infusion.

7. A *gas* is that form of matter in which the molecules tend to get away from each other; it has neither definite shape nor volume. *Laughing gas* is nitrogen monoxide, N_2O. *Marsh gas* is methane, CH_4. *Sewer gas* is the air from sewers, of variable composition, containing emanations from sewage.

8. *Metals:* Lead, Pb; gold, Au; silver, Ag; copper, Cu; zinc, Zn; tin, Sn. *Non-metals:* Hydrogen, H; oxygen, O; nitrogen, N; fluorine, F; chlorine, Cl; iodine, I.

9. By *oxidation* we mean the act of union of oxygen with another element or compound. This process is attended by the liberation of heat, and, when it takes place rapidly, of light. The rusting of a given weight of iron is a slow oxidation, while the burning of the same in oxygen is a rapid oxidation. Only the latter produces light, while in both cases the same amount of heat is liberated.

By *combustion*, in a general sense, is meant the rapid union of the oxygen of the air with some other substance, as coal or phosphorus. In a wider sense, however, combustion may be defined as any chemical union of two substances attended by liberation of heat and light.

10. Both mercurous and mercuric salts enter into double decomposition with potassium iodide, and a soluble iodide of mercury is produced.

11. The most *common sources of lead poisoning* are the following: "The contamination of drinking water from lead pipes. Contamination of articles of food or drugs by contact with leaden vessels, or from being enclosed in tinfoil containing an excess of lead. Drinking beer, cider, etc., which has been drawn through leaden pipes or allowed to stand in pewter vessels. The ingestion or constant handling of lead or its compounds, as the acetate, nitrate, carbonate (white lead—painter's colic), Goulard's extract, etc. The use of hair dyes containing lead."—(Witthaus' *Essen-*

tials of Chemistry.) The *treatment* is first to remove the cause; then administer a purge of jalap and calomel combined with opium; iodide of potassium should also be given to help in the elimination of the lead.

12. *Ptomains* are basic, nitrogenous compounds, produced from protein material by the bacteria which cause putrefaction. They are found in protein foods which have partly undergone decomposition. *Ptomain poisoning. Symptoms:* Chilliness, headache, vertigo, muscular twitchings, hallucinations, imperfect vision, weak and rapid pulse, nausea, vomiting, diarrhea, cyanosis, early dyspnea, often subnormal temperature, and occasionally cutaneous eruptions. The prognosis is guardedly favorable. *Treatment* consists in the use of emetics and cathartics, of lavage and rectal irrigation. Morphine may be indicated for the relief of pain, and collapse is to be combatted by atropine, strychnine, nitroglycerin, external heat, whiskey, etc. After thorough purging, salol, naphthol, or bismuth may be given.

MATERIA MEDICA AND THERAPEUTICS.

1. *Analgesic* is an agent which relieves pain by blunting sensation; as opium. *Anesthetic* is an agent which destroys sensation for a period of time; as ether. *Hypnotic* is an agent used to induce sleep somewhat resembling natural sleep; as chloral.

2. *Atropine* (*a*) dilates the pupil and causes disordered vision; it stimulates the end organ of the sympathetic, and paralyzes those of the motor oculi nerve. (*b*) It increases the rate (but not the force) of the heart by depressing the vagus. (*c*) Intestinal peristalsis is increased by its action on the splanchnic nerves. (*d*) The skin is flushed and rendered dry by its paralyzing action on the nerve endings in the sweat glands.

3. *Anthelmintics* are agents which kill or expel worms. *Examples:* Oleoresina aspidii, gr. xxx; Pelletièrine tannate, gr. x; santonin, gr. j; pumpkin (pepo) seeds, ℥j.

4. Bromide of potassium, of sodium, of lithium, of ammonium, of calcium. *Physiological action:* Depressants of circulatory and nervous systems; hypnotic, analgesic; muscular depressant; lower arterial tension and body temperature; anaphrodisiac.

5. (*a*) *Mydriatic,* Atropine; (*b*) *Expectorant,* Ipecac; (*c*) *Anodyne,* Opium; (*d*) *Escharotic,* Silver nitrate; (*e*) *Styptic,* Alum.

6. (*a*) On the *brain,* alcohol first acts as a stimulant; the nerve centers, imaginations, feelings, intellect are all exalted; the centers of speech and muscular movements are stimulated; afterwards they may be depressed. (*b*) On the *heart,* alcohol causes increase in the force and

frequency, dilatation of the peripheral blood-vessels. (*c*) On the *kidneys*, alcohol acts as a diuretic.

7. (1) *Alcohol* lowers body temperature by diminishing tissue change, and also by dilating the cutaneous vessels, thus increasing heat radiation. (2) *Aconite*, by reducing the circulation. (3) *Acetanilid*, by diminishing tissue change, and also by promoting perspiration.

8. ICHTHYOL. *Source:* A quartz containing the fossilized remains of fish. *Therapeutic uses:* Skin diseases (eczema and psoriasis), to remove inflammatory processes and their products. ADEPS LANÆ. *Source:* Sheep's wool. *Therapeutic uses:* As a basis for ointments, in various skin diseases, chaps, burns, frostbites, and as a vehicle for morphine and other anodynes.

9. (*a*) *Opium* is a sedative to the intestine, secretions are dried, pain is relieved or prevented, peristalsis is slowed or arrested. (*b*) *Thymol* is an intestinal antiseptic, and an anthelmintic in ankylostomiasis. (*c*) *Bismuth subnitrate* is sedative and astringent.

10. Saline purgatives cause a great increase in the amount of fluid secreted by the intestinal glands; they also hinder the reabsorption of this fluid. The result is an accumulation of fluid in the intestine, which, by distention, excites peristalsis.

11. An *alkaloid* is an organic nitrogenized substance, alkaline in reaction, and capable of reacting with an acid in the same way that ammonia does. Example, strychnine. A *tincture* is an alcoholic solution of a non-volatile medicinal substance. Example, tincture of aconite. A *fluidextract* is a solution of vegetable drug of such strength that 1 c.c. of the fluidextract represents one gram of the drug. Example, fluidextract of belladonna.

12. (*a*) *Strychnine*, as stimulant to cardiac, respiratory, nervous, or muscular system. Dose, gr. 1/64. (*b*) *Calomel*, in glandular inflammations of throat and neck, irritable stomach, diarrhea, dysentery, gastric ulcer. Dose, gr. x; but often best given in divided doses. (*c*) *Tincture of aconite*, in coryza, tonsillitis, fevers, pleurisy, meningitis, peritonitis, pneumonia, rheumatism. Dose, ℥v of the tincture; but divided doses are often better. (*d*) *Hyoscine* in mania, insomnia, hallucinations, delirium, whooping cough, irritability of the bladder, as a hydriatic. Dose, hyoscine hydrobromide, gr. 1/150. (*e*) *Potassium iodide* in tertiary syphilis, neuralgia, paralyses, mercurial poisoning, after pneumonia, pleurisy, or pericarditis, aneurysm, hay fever, tonsillitis, asthma. Dose, gr. vijss.

PATHOLOGY.

1. *Rise of temperature* is caused by: Disturbances in the thermogenetic, thermolytic, or thermotactic centers; excessive heat; toxic substances; infectious diseases.

2. *Hypertrophy* is an increase in the size, weight, and functional activity of a part beyond the limit of health, due to an orderly enlargement or multiplication of all its normal constituents. *Varieties:* (1) Simple, when only the size of the element is increased; (2) *Numerical,* when the number also is increased. *Causes:* (1) Excessive vital energy; (2) increased work; (3) increased blood supply; (4) diminished waste; (5) removal of resistance to growth.

Atrophy is decrease in the amount of tissue, owing to diminution in size (simple atrophy) or number (numerical atrophy) of the histological elements of which it is composed. There is also loss of weight, and impairment of function. *Varieties:* Simple and numerical (see above); also general and local. *Causes:* (1) Deficient supply of nutrition; (2) excessive waste; (3) impaired vital activity; (4) diminished functional activity; (5) pressure; (6) sometimes excessive functional activity.

3. In *necrosis* the tissue is dead; in *degeneration* its vitality remains, but is lowered, and the function may remain in an impaired state.

4. Trachoma is infectious, but the causal germ is not identified. There are follicles on the conjunctiva, which become granular masses and spread over the surface of the entire lid. Ulceration takes place, and the necrosed membrane is replaced by scar tissue.

5. *Gangrene* means death of tissue in macroscopic portions. Two kinds: (1) *Dry gangrene* occurs when death happens in a part which has been previously drained of its fluids. The actual cause is arterial thrombosis supervening on atheroma or calcification of vessels. If the part is quite dry sepsis does not occur, so it shrivels into a black or dark-brown mass. If putrefaction occurs it becomes very offensive.

(2) *Moist gangrene* occurs when the dead part is full of fluids, and may be either aseptic or septic, generally the latter. If septic, the tissues putrefy and foul-smelling gas is formed. The progress of the case depends on the size of the dead part and the presence or absence of organisms. If small and aseptic, the necrotic area may be infiltrated with leucocytes, broken up and absorbed. More generally the dead tissue is cast off in one of two ways: 1. In *aseptic gangrene* the line of junction between the gangrenous and living tissues is infiltrated with leucocytes; separation occurs there through the whole thickness of dead tissue, and healing by granulation follows. 2. In *septic gangrene* there is similar ulceration, but it spreads along the living structures owing to the effect of the toxins formed in the dead tissues, till either a barrier of sufficient inflammation occurs or amputation is performed. The site of junction is called a line of demarcation, but suppuration

may extend beyond this along muscular planes, or by lymphatics and veins.—(*Aids to Surgery.*)

6. "The broken ends of the bone are rough and irregular, and the periosteum is torn more or less, but some portion usually remains as a bridge between the fragments. The soft structures in the neighborhood are lacerated, so that the parts are infiltrated with blood-clot, which fills up the spaces between the bone ends. As in repair of any other part, the blood-clot in a few hours is infiltrated with leucocytes, whose duty it is to absorb the clot. The connective-tissue cells in the surrounding parts proliferate, and the bone undergoes rarefying osteitis, so that the place of the blood-clot is taken by granulation tissue. The granulation tissue becomes calcified, and the calcified tissue is ultimately replaced by bone. The periosteum plays a large part in the ossification of the new tissue. It becomes stripped up for some distance, hyperemic, and thickened. Granulation tissue is formed from it, and unites with that which has replaced the blood-clot. This mass binds the bone together and forms the *provisional* or *ensheathing callus*, which is subsequently ossified by the growth of the periosteal osteoblasts spreading over the mass. The medulla becomes plugged with granulation tissue or *internal callus*, and this, as well as the granulation tissue lying between the fragments of compact bone, becomes ossified, the bone cells of the compact tissue probably proliferating to take part in the repair." *(Aids to Surgery.)*

7. *Pathology of typhoid fever.* "Principally inflammation of the lymphoid tissue of the lower portion of the ileum, with more or less catarrh throughout the bowels. Peyer's Patches—First week.—Are swollen through infiltration of leucocytes, the surfaces raised and fawn-colored; the infiltration involves the submucous coat. The lesions are most numerous at the lower end of the ileum. Second week.—The surface becomes abraded; sloughs form, which are often bile-stained. Third week.—Sloughs come away, leaving ulcerating surfaces. Typical typhoid ulcers are thus formed. A few solitary glands undergo the same process. At the end of the week the ulcers begin to granulate, but healing is usually slow.

"Mesenteric glands may undergo the same changes, but more often become swollen, red, and tender only, or break down into cheesy masses. Other organs: Spleen and liver are enlarged; heart is soft and flabby. The voluntary muscles undergo granular degeneration; in fact, similar changes to those found after death from high temperature." (Wheeler and Jack.)

8. Catarrhal, necrotic, and interstitial. *Catarrhal* appendicitis is characterized by slight swelling and minute erosions of the mucosa. The muscular and serous coats will

show slight infiltration and the lumen will contain epithelial and pus cells. In the *necrotic* or *gangrenous* variety the inflammatory processes are destructive. The mucosa is destroyed and the muscular and serous layers are soon attacked. The inflammation involves neighboring surfaces and a fibrinous peritonitis develops. This may be local, and by giving rise to adhesions between adjacent tissues no further extension takes place. The process may be very rapid and perforation follow before any restricting adhesions form; this is accompanied by a general and frequently fatal peritonitis. In *interstitial* appendicitis there is a tendency toward excessive connective-tissue formation and it generally terminates as a chronic thickening. (McConnell's *Pathology.)*

9. ***Cretinism*** is a congenital condition, marked by mental hebetude and imbecility, imperfect development, and deformity of the whole body. It is said to be due to congenital absence or functional inactivity of the thyroid gland.

10. "The *phenomena of inflammation* are dilatation of the arterioles, capillaries, and small veins. At first the blood-current is quickened, then retardation occurs, and may progress to stasis and thrombosis. During this time exudation of plasma and white corpuscles from the small vein, and perhaps the capillaries, is going on. The fate of the white cell may be either to break up and set free prothrombin, or to act as food for connective-tissue cells, or to act as a phagocyte and be transformed into a pus corpuscle. Red corpuscles may be exuded and broken up, setting free their coloring matter. The prothrombin of the white cells unites with the calcium chloride of the plasma, and forms thrombin, or fibrin ferment, which acts upon the fibrinogen of plasma to form fibrin. The *tissues* are thus invaded with numbers of leucocytes. In bacterial inflammation a varying portion of the tissues is killed by the toxins produced, and is either replaced by a mass of small round cells, or liquefied into pus. In the latter case it is surrounded by a ring of small round cells. The connective-tissue cells absorb the leucocytes, and new vessels are formed, thus constituting repair. In non-bacterial inflammation, exudation may separate layers of cells to a large extent and form blebs. In chronic inflammation the formation of new fibrous tissue is the chief part of the process."—(*Aids to Surgery.*)

PRACTICE OF MEDICINE.

1. In *cerebrospinal meningitis,* the lumbar puncture will show the diplococcus intracellularis meningitidis in the fluid, the Kernig's sign will also be present. Both of these will be missing in the poliomyelitis. There are many other differences; but these are pathognomonic.

2. *Rickets* is a disease of young children characterized by nutritional changes, deformities of the bones, weakness of the muscles and ligaments, and various nervous disorders. Heredity, faulty hygiene, and improper feeding are etiologic factors of importance.

Symptoms: The early symptoms may be very mild, but in severe cases restless sleep, profuse sweating of the head, digestive and nervous disturbances, and perhaps slight fever are present. The bones soften and enlarge at their articulations. Dentition is delayed and the fontanels remain open. The appetite is capricious, constipation is marked and may alternate with diarrhea, and the abdomen is enlarged and tympanitic. The affection predisposes to inflammation of the various mucous membranes, and various deformities are liable to result from the changes in the bones. The course of the disease is chronic, although marked improvement takes place after proper treatment has been instituted.

Treatment consists largely of fresh air, sunlight, daily bathing and proper feeding. Cod-liver oil (gtt. 10 to 31), syrup of the lactophosphate of lime (3½), syrup of the iodide of iron (gtt., 2), and similar remedies may be administered. Sweating may be controlled by atropine (gr. 1/800-1/200). Small doses of calomel and soda are beneficial in gastrointestinal disturbances. Deformities may be prevented by postural methods, friction, massage, and the avoidance of exertion. (Pocket *Cyclopedia.)*

3.

ACUTE PARENCHYMATOUS NEPHRITIS.	CHRONIC PARENCHYMATOUS NEPHRITIS.	CHRONIC INTERSTITIAL NEPHRITIS.
1. Urine scanty, dark or smoky color, high specific gravity, 1025 or over.	1. Urine normal or increased amount; specific gravity may fall to 1010; urine pale.	1. Urine greatly increased; specific gravity low, 1005; urine pale in color.
2. Large amount of albumin.	2. Late in attack, greatly diminished; occasionally absent.	2. Albumin greatly diminished, often absent.
3. Variety of casts, such as hyaline, blood, epithelial, and waxy casts, also free red blood globules, and epithelial cells.	3. Large and small granular casts; compound granule cells, and fatty epithelium.	3. Hyaline or finely granular casts, occasionally dark in color; infrequently blood casts and oil droplets.
4. Urea diminished.	4. Urea diminished.	4. Urea diminished.

4. Typhoid fever is distinguished from appendicitis by its (typhoid's) more gradual onset, characteristic temperature record, diarrhea, enlargement of the spleen, rose-colored rash, and boidal reaction.

5. Typhoid, malaria, cerebrospinal meningitis, diphtheria, gonorrhea, anemias, leukemias, nephritis, Hodgkin's disease, tuberculosis, empyema, filariasis, anthrax, hydrophobia, syphilis, leprosy.

6. There are two normal heart sounds which follow in quick succession, and are succeeded by a pause. The first, or systolic, sound is dull and somewhat prolonged; the second, or diastolic, sound is sharper and shorter. The sounds may be expressed by the syllables *lubb—dup*. The first sound is heard best at the apex beat in the fifth left intercostal space; the second sound is heard best over the second right costal cartilage. The *causes* producing the *first* sound of the heart are not definitely ascertained; the following are supposed to be causatory factors: (1) the vibration and closure of the auriculo-ventricular valves, (2) the muscular sound produced by the contraction of the ventricles, and (3) the cardiac impulse against the chest wall. The *second* sound is caused by the vibration due to the closure of the semilunar valves.

7.

	GLAUCOMA.	IRITIS.
Age	Over forty.	Any.
Tension	Plus.	Normal.
Congestion	General, especially scleral.	General, especially circumcorneal.
Cornea	Cloudy and steamy surface.	Cloudy.
Anterior chamber.	Shallow.	Unchanged.
Pupil	Dilated, oval.	Contracted, synechiæ.
Pain	Severe, continuous.	Especially at night.
Vision	Much reduced.	Somewhat reduced.
Treatment	Escerine, pilocarpine, iridectomy.	Atropine.

Treatment of glaucoma: Myotics, such as eserine or pilocarpine; massage of the eyeball; mydriatics are contraindicated; operative treatment may include paracentesis, iridectomy, or sclerotomy.

Treatment of iritis: Atropine, dionine, the application of leeches to the temples, hot fomentations, absolute rest in bed, protection from the light, light diet, purgatives, absti-

nence from alcohol, avoidance of all use of the eyes for near work, constitutional treatment varying according to the etiology, paracentesis, and iridectomy.

8.

	WOMAN'S MILK. *Average Per Cent.*	COW'S MILK. *Average Per Cent.*
Fat	4.00	4.00
Sugar	7.00	4.50
Proteids	1.50	3.50
Salts	0.20	0.75
Water	87.30	87.25
	100.00	100.00

To make cow's milk resemble human milk: The cow's milk must be diluted and sugar of milk must be added. These modifications must be made in such proportions as to bring the percentage composition of the two milks as near alike as possible.

9. *Simple catarrhal jaundice* is caused by some undetermined infectious agent, extension of catarrh of the duodenum up the common bile-duct, and certain diseases, as pneumonia, typhoid fever, etc. The symptoms are nausea, vomiting dull frontal headache, mental hebetude, jaundice, constipation, high-colored, scanty urine, slow and full pulse, and slight fever. The condition terminates favorably in 1 to 3 weeks. The treatment consists in rest in bed, liquid diet, and the administration of fractional doses of calomel (gr. ¼ every hour for 6 or 7 hours) followed by a saline purge if necessary. Later, constipation may be avoided by the use of the salines and mineral waters. Lavage, rectal irrigation, and blisters over the right hypochondrium may be employed. *(Pocket Cyclopedia.)*

10. *Stomatitis* is an inflamed condition of the mouth, common during childhood, during dentition, and in certain fevers. It is due to dirt, irritation, mercury, or micro-organisms. *Symptoms:* Pain, difficulty in swallowing, in speaking; increased salivation, fetid breath and some constitutional disturbances. *Treatment:* Remove the cause, cleanliness, lotion of glycerine and borax; sometimes nitrate of silver, or chlorate of potassium may be of service.

OBSTETRICS.

1. *Positive signs of pregnancy:* (1) Hearing the fetal heart sound; (2) active movement of the fetus; (3) ballottement; (4) outlining the fetus in whole or part by palpation; and (5) the umbilical or funic souffle. *Doubtful signs of pregnancy:* (1) Progressive enlargement of the uterus; (2) Hegar's sign; (3) Braxton Hick's sign; (4)

uterine murmur; (5) cessation of menstruation; (6) changes in the breasts; (7) discoloration of the vagina and cervix; (8) pigmentation and striæ; (9) morning sickness. *Subjective signs of pregnancy,* in the order of their appearance, are: Cessation of menstruation, morning sickness, increased frequency of urination, active fetal movements. *Objective signs of pregnancy,* in the order of their appearance, are: Softening of the cervix, changes in the mammary glands, discoloration of the vulva and vagina, pulsation in the vaginal vault, Hegar's sign, active fetal movements, ballottement, palpation of the fetus, intermittent uterine contractions, hearing the fetal heartbeat, rate of growth of the uterine tumor.

2. *Management of breech cases:* As a rule it should not be interfered with until the breech is born. The physician should then: (1) As soon as the hips are delivered, draw down a loop of the cord, as otherwise it may be compressed between the child's head and the pelvic brim during the descent of the former, and, not being able to pass down as rapidly as is required, it may be torn off at the umbilicus or so stretched as to interfere with the placental circulation. If the cord is pulsating strongly, place the loop thus drawn down out of the way in the postero-lateral part of the pelvic excavation. If the pulsation is feeble or absent, hurry the delivery. As soon as the body is born as far as the shoulders, it should be wrapped in a warm wet towel to prevent premature attempts at respiration and the consequent inspiration of mucus from the vagina. (2) As the shoulders are coming down, endeavor to secure anterior rotation, if it is in a posterior position. (3) As soon as the body is born, bring down the arms, if extended. (4) If the head is not at once born, pass two fingers to its mouth, to secure a supply of air and to admit of respiration. (5) Draw the body down against and parallel to the perineum (to flex the head). Then elevate the body, turning it over on the mother's abdomen while making traction. An assistant, if possible, should press upon the hypogastrium, to force the head down. Repeat the maneuver, if necessary.—(Landis' *Obstetrics.*)

3. **The foramen ovale closes any time between the first week and the sixth month of extrauterine life.**

4. *Diseases of pregnancy:* Smallpox, scarlet fever, measles, cholera, typhoid, pneumonia, influenza, erysipelas, sepsis, gonorrhea, tetanus, anthrax, tuberculosis, malaria, syphilis, valvular heart lesions, myocarditis, endocarditis, phlegmasia, pulmonary embolism, emphysema, asthma, dyspnea, varicose veins, edema, icterus, atrophy of liver, indigestion, constipation, enteroptosis, salivation, dental caries, toothache, nephritis, diabetes, hematuria, floating kidney, cystitis, paralysis, neuralgia, neuritis, chorea, epi-

lepsy, hysteria, goiter, anemia, leukemia, pruritus and skin diseases.

5. *The varieties of ectopic pregnancy* are: Interstitial, tubal, ovarian, and abdominal.

6. PROLAPSIS UTERI. *Definition:* A condition in which the uterus sinks below its normal level, but does not protrude through the vagina. *Pathology:* "Decrease in the power of uterine support. Distention and eversion of the vagina with decrease in the power of its sphincter and thickening of its epithelium. The uterus is enlarged from impairment of its circulation, its cavity is increased in size, and hyperplasia of its areolar tissue may result. The endometrium becomes thickened, congested, and inflamed. Ectropion may occur. Varicose degeneration of the vessels of the cervix may take place with consequent absorption of its proper tissue; ulceration may also occur. Pelvic congestion from compression of the hypogastric veins. Tension on the broad ligaments may produce obstruction of ureters and hydronephrosis. Occasionally, epithelioma from continued irritation of the cervix. Varicocele of the pampiniform plexus from torsion of the broad ligaments. When cystocele is present, complete evacuation of the bladder cannot be obtained, and the result is dysuria, ardor urinæ, and cystitis or retention of urine."

Etiology: Injury at childbirth, lacerated perineum, relaxation and elongation of the ligaments of the uterus, loss of rigidity of the abdominal walls, increase in the weight of the uterus, subinvolution, increased intraabdominal pressure. *Treatment:* "Operative, unless some contraindication to operation exists. In such a case some *mechanic device* should be tried for the support of the uterus. Pessaries are not to be recommended, as their constant use leads to irritation and excoriation of the yaginal walls. Probably the best means for supporting the uterus is by Braun's colpeurynter. This is worn only during the day, and can be introduced by the patient herself every morning. The uterus is replaced and the colpeurynter well anointed with carbolized vaseline and containing about an ounce of water, is introduced into the vagina. It is then distended with air, thus making an even pressure on the vaginal walls and not causing ulcerations. *Operative treatment* gives the most satisfactory results in prolapse. In slight cases of prolapse repair of the perineum will effect a cure. The severer grades will require, in addition, some operation on the anterior vagina. The best of these is Martin's operation for cystocele. If the cervix is hypertrophied it should be amputated. Three operations—on the perineum, for cystocele, and amputation of the cervix—are required in the usual case of prolapse. In addition, hystrorrhaphy may be advisable, since there can be no prolapse so long as

the uterus maintains its normal position of anteflexion. These operations failing, hysterectomy may be performed."

7. Pruritus vulvæ may be *caused by:* Parasites; diseases of the vulva, as inflammation, edema, vegetations, congestion, irritating discharges, lack of cleanliness, diabetic urine; it may also be of nervous origin, or idiopathic. *Treatment* consists in removing the cause, if possible; cleanliness, fresh air, tonics, and general attention to hygiene; local applications of solution of bichloride of mercury, 1:2,000; or carbolic acid, 1:100; or lead and opium; dusting powders of bismuth subnitrate, calomel, or zinc oxide are also useful.

8. *Menorrhagia* is an excessive loss of blood at the menstrual periods. *Metrorrhagia* is a hemorrhage from the uterus at other than the menstrual periods. It is very often impossible to differentiate the two conditions. *Treatment:* Remove the cause, if possible; treat abnormal conditions that are present; vaginal douches, tampons, and curettage have been recommended; also ergot, hamamelis, hydrastis, and viburnum prunifolium; rest in bed is necessary. Intrauterine applications of astringents or of adrenalin have been used.

9. *Vaginitis* is a condition of inflammation of the vagina. It is characterized by redness, swelling, pain, heat, irritation, and increased secretion. There may be frequent and painful urination. *Treatment* consists in rest, cleanliness, douches, the application of soothing lotions, and removal of any cause; salines and anodynes are also indicated. *Vaginismus* is a condition of painful and spasmodic contraction of the vaginal orifice, which renders coitus either painful or altogether impossible. The slightest touch causes painful spasms, and examination may be impossible without an anesthetic. The *treatment* consists in removing the cause when possible, tonics and general constitutional treatment, dilatation of the vaginal orifice; local application of a 5 per cent. solution of cocaine will relieve the hyperesthesia and allow coitus. The condition is sometimes incurable.

10. SUBINVOLUTION. *Etiology:* Lacerations of the cervix; absorption of septic products; mismanagement of the convalescent stage of the puerperium, chiefly too early rising; tedious labors; misplacement of the uterus; retained clots or membranes; tumors of the uterus. *Treatment:* Rest in bed, hot intrauterine and vaginal douches, correction of constipation, abstention from sexual intercourse, tonics, correction of displacement, curettage. An abdominal binder may be worn.

SURGERY.

1. *Septicemia* is an acute general infection arising from the presence of pyogenic microorganisms in the blood.

Causes: Streptococcus pyogenes or other pus-producing bacteria which spread from a primary focus through the lymphatics or by an eroded vessel into the blood current.

2. *Ankylosis may be averted* by: Limiting the effusion or inflammatory exudate; by early passive movement to prevent the union of synovial surfaces; by massage; by removal of loose cartilages and hypertrophied synovial fringes.

3. *To arrest epistaxis:* (1) Try to cauterize the bleeding point; (2) plug the nasal cavity with gauze soaked in adrenalin; (3) inject into the nares a solution of peroxide of hydrogen; (4) plugging the nares, anteriorly and posteriorly; (5) an inflating plug may be used.

4. "*Compound dislocations* are always serious lesions, for not only is the skin lacerated and the joint exposed to the risk of septic contamination, but adjacent vessels and nerves are liable to injury. Unless efficient treatment is adopted, suppurative arthritis ensues, leading to disorganization of the articulation, with subsequent ankylosis, or, in the case of larger joints, possibly to death from pyemia and septic poisoning. The *treatment* consists in rigid antisepsis to the wound, together with reduction of the dislocation. If necessary, the opening in the skin must be enlarged, in order to allow of the replacement of the bone, and should the latter structure be much bruised or injured it may be advisable to resect it at once. If, however, vessels and nerves are also injured, or if the patient is old or debilitated, amputation may be required." (Rose and Carless' *Surgery.)*

5. *Dislocations of the knee* are: Forward, backward, outward and inward.

Treatment of forward dislocation: Give ether; have one assistant extend the leg and another one make counter-extension on the thigh, while the surgeon pushes the bone into place. Put the limb in a double inclined plane; combat inflammation; begin passive motion in about three weeks; patient must wear a knee-support for many months.

6. Simple fracture with depression, compound fracture with depression, and any fracture if distinct symptoms are present.

7. *Wounds are classified* as:

I. Contused and open wounds.

II. Open wounds may be: Incised, lacerated, contused, punctured, gunshot, or poisoned; also penetrating and perforating.

III. Aseptic and septic.

8. By paracentisis of the abdomen. "The usual plan adopted is to seat the patient on a chair and to encircle the abdomen with a flannel binder, the ends of which are split to within 6 inches of the middle line. The unslit portion

is placed over the abdominal wall in front, while the divided portions cross behind, and are held by assistants, so as to make continuous pressure upon the abdominal contents. The bladder is completely emptied, and then the abdomen is carefully percussed, and a spot of absolute dullness selected; here a small incision is made with a scalpel after careful purification of the skin, and a suitable trocar and cannula inserted. The median line below the umbilicus is the place usually chosen for the puncture, but there is no objection to inserting the trocar through the flanks."

9. *Indications for removal of mammary gland:* Enormous hypertrophy, Paget's disease of the nipple, epithelioma of the nipple, carcinoma, sarcoma, cystic adenoma, diffuse tubercular or septic disease if breast is riddled with sinuses.

10. *Chief surgical diseases of the groin* are: Hernia (inguinal, femoral, or obturator), aneurysms, tumors, cysts, ulcers, sinuses, abscesses, enlarged glands, undescended testicle, prolapsed ovary.

STATE BOARD EXAMINATION QUESTIONS.

New Hampshire State Board of Medical Examiners.

ANATOMY.

1. With what bones does the superior maxillary bone articulate?
2. What muscles flex the fingers? Give method of attachment of ligaments of the same.
3. Describe fully the peritoneum.
4. Give location of apex beat, and area of dullness of the normal heart.
5. State fully the method of exit of the nerves from the spinal cord through the foramina in the vertebral column.
6. Describe the ligamentum nuchæ.
7. Enumerate and describe the pectoral muscles.
8. Give origin, course, termination, and branches of brachial artery.
9. Bound and give contents of popliteal space.
10. What tissues are severed in reaching an appendix by the right semilunaris incision?

PHYSIOLOGY AND HYGIENE.

1. Give the normal temperature of the body and two physiological reasons for increased temperature.
2. What is the physiological function of lymph and chyle?
3. Name the physical properties of normal urine.
4. Describe the normal and abnormal motor processes of the stomach.

5. What is Wallerian degeneration? How may it be made use of in studying the course of a tract of nerve fiber?
6. Describe the causes for each step in the passage of oxygen from the atmospheric air to the tissues.
7. What are the healthful preservatives for foods?
8. What diseases should be reported to the board of health, and why?
9. What are the sources of bacteria in milk, and how would you control?
10. What are the physical and chemical characteristics of healthful water?

CHEMISTRY.

1. Explain the difference between a (*a*) solid, (*b*) liquid, (*c*) gas.
2. (*a*) Define capillary attraction. (*b*) Why is it so called? (*c*) Mention some familiar examples.
3. What is electrolysis?
4. What is the composition of baking powders? How are they adulterated? What is their mode of action?
5. Define chemical affinity (chemical force, or attraction, chemism), and give example.
6. Describe the purification of water by distillation and by filtration.
7. What is the effect of diluting tincture of iodine with water, and what practical application is drawn therefrom?
8. What is the action of KHO when taken internally, and what antidotes should be used?
9. Why is zinc sulphate incompatible with the vegetable astringents?
10. In what parts of the body does uric acid occur, and in what form does it exist?

PATHOLOGY AND DIAGNOSIS.

1. Name and describe the germ of syphilis.
2. Give the probable cause and symptoms of calculi of pancreas.
3. Describe a case of Rocky Mountain spotted fever and mention its probable cause.
4. Describe the gonococcus and the method of staining for microscopical examination.
5. Give the causes and symptoms of hemothorax.
6. Give the symptoms and pathology of elephantiasis.
7. Describe a case of Hodgkin's disease and give its pathology.
8. Give the symptoms of disease of the coronary arteries.
9. Describe a case of hay fever and mention some of its probable causes.
10. Give the symptoms of brain tumor.

NEW HAMPSHIRE.

THERAPEUTICS.

1. What do you understand by Cheyne-Stokes respiration, and under what conditions may it occur?
2. Give the etiology and treatment of acute sciatica.
3. Describe, briefly, the conditions that would lead you to diagnose chronic interstitial nephritis, and give your treatment.
4. What symptoms would lead you to diagnose gastric ulcer and what would be your treatment?
5. What is Bell's palsy and what pathological conditions may produce it?
6. Give the symptomatology and treatment of tetanus.
7. Give the therapeutics of ergot and the symptoms of acute and chronic ergotism.
8. Give the therapeutics of chloral hydrate and the symptoms of a toxic dose of the drug.
9. Under what conditions would you expect enlargement of the spleen?
10. Give the symptoms of acute pancreatitis.

OBSTETRICS.

1. Describe the change in position which the uterus undergoes during pregnancy.
2. What is "morning sickness," when does it begin, how long does it generally continue, and what are its causation and treatment?
3. What are the danger signals of impending eclampsia?
4. What are the symptoms of an inevitable abortion?
5. What are the dangers to the mother during the second stage of labor?
6. Symptoms and conditions leading you to diagnose death of the fetus.
7. How can you distinguish between first and subsequent pregnancies?
8. Give indications calling for podalic version.
9. What conditions of the mother might be mistaken for pregnancy?
10. Treatment of placenta prævia.

SURGERY.

1. Describe a method of reduction of a dislocation of the inferior maxillary bone.
2. What is a Colles' fracture? How would you treat it?
3. What are sources of wound infection?
4. What do you understand by primary and secondary shock?
5. Describe intravenous saline transfusion and give dangers of the operation.
6. How and where would you trephine for cerebral hemorrhage?

7. What do you understand by complete operation for mammary cancer?

8. Describe operation for gallstones.

9. Describe Bassini's operation for inguinal hernia.

10. Give the differential diagnosis of pelvic peritonitis and impaction of feces.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

New Hampshire State Board of Medical Examiners.

ANATOMY.

1. The *superior maxillary bone articulates with:* Frontal, ethmoid, nasal, malar, lacrymal, inferior turbinate, palate, vomer, and its fellow of the opposite side; sometimes, also, with the sphenoid.

2. *Muscles that flex the fingers:* Flexor sublimis digitorum, flexor profundus digitorum, flexor minimi digiti, lumbricales, and interossei. The flexor sublimis digitorum is inserted by four tendons, each to the sides of a second phalanx. As the tendons pass through the annular ligament, those for the middle and ring fingers are side by side in front, the others behind them. Each tendon is accompanied by a tendon of the flexor profundus, and permits the passage of the latter through a split which occurs opposite the first phalanx. The separated halves become united behind the tendon of the deep flexor, opposite the base of the second phalanx, but almost immediately separate again, and are inserted into the sides of the second phalanx. The tendons are bound down to the phalanges by a ligamentous sheath. Each of the four tendons of the flexor profundus is inserted into the front of the base of a last phalanx. Each tendon perforates a tendon of the superficial flexor opposite the first phalanx of the finger to which it belongs; each is bound to the first and second phalanges by ligaments which form a sheath common to this and the sublimis tendon. (Gerrish's *Anatomy.)*

3. The peritoneum. *Course of the peritoneum forming the greater sac, in longitudinal section:* Passing down from the umbilicus, the peritoneum lines the anterior abdominal wall—covers the urachus and obliterated hypogastric arteries—passes onto the bladder, from its upper aspect to the trigone—is reflected onto the anterior and upper part of the lateral aspects of the rectum, in the male, forming the recto-vesical pouch. In the female, the reflection is from the bladder onto the uterus (utero-vesical fold)—extending thence over the upper portion of the posterior vaginal wall—and thence to the rectum (recto-vaginal pouch). From the rectum, the sigmoid flexure of

the colon is entirely covered (sigmoid mesocolon)—the ascending and descending colons being covered, generally, only anteriorly and laterally—and passing from the spine downward, the peritoneum covers the small intestines, forming the lower leaf of the mesentery—and thence back again, completing the investment of the small bowel, forming the upper leaf of the mesentery—and passes backward over the transverse portion of the duodenum to the pancreas—thence forward to form the inferior layer of the transverse mesocolon—covers the inferior and part of the anterior aspect of the transverse colon—thence runs downward to form the posterior layer of the great omentum—returning to form the anterior layer of the great omentum—thence to the stomach, covering its antero-superior aspect—thence to the under surface of the liver, forming the anterior layer of the lesser or gastro-hepatic omentum—thence covers the inferior surface of the liver, from the transverse fissure to its anterior border—whence it is reflected over the anterior border to cover the superior surface of the liver to the posterior peritoneal limit—thence it passes to the inferior concave surface of the diaphragm (superior layer of the coronary ligament)—thence over the anterior portion of the concavity of the diaphragm to the anterior abdominal wall—whence it passes down the anterior abdominal parietes to the umbilicus, to the place of beginning.

"*Course of the peritoneum forming the lesser sac—in longitudinal section.*—Beginning at the posterior aspect of the stomach, which it covers, the peritoneum of the lesser sac passes upward to the inferior surface of the liver, behind the transverse fissure, forming the posterior layer of the lesser or gastro-hepatic omentum—and having covered the postero-inferior aspect of the liver, it passes on to the under surface of the diaphragm (inferior layer of the coronary ligament)—thence passes downward over the posterior portion of the concavity of the diaphragm to the spine, covering the great vessels—thence to the pancreas—thence forward, forming the upper layer of the transverse mesocolon—covers the supero-anterior aspect of the transverse colon—descends, forming the innermost layer of the great omentum—then ascends to the greater curvature of the stomach—and covers its posterior wall, to the place of beginning. The lesser sac is in relation with the inner aspect of the spleen, forming the inner layer of the gastro-splenic omentum—and also in relation with the superior portion of the left kidney." (Bickham's *Operative Surgery.*)

4. The *apex beat of the heart* is in the fifth left intercostal space, about 3¼ inches from the median line.

The *area of complete cardiac dullness* is included between a line drawn from the center of the sternum on a

level with the fourth costal cartilage, to the apex of the heart, and a line drawn from the same point down the lower third of the mid-line of the sternum. Below, this area merges into the liver dullness. (From Gray.)

5. There are 31 pairs of spinal nerves, viz.: 8 cervical, 12 dorsal, 5 lumbar, 5 sacral, and 1 coccygeal. Each nerve arises from the spinal cord by an anterior (motor) and a posterior (sensory) root, the latter having a ganglion developed upon it. These roots join together in the intervertebral foramen, and upon issuing from it immediately split up again into two parts, the anterior and posterior primary divisions, each containing fibers from the two roots. The anterior primary divisions supply the parts in front of the spine, the posterior primary divisions the parts behind that column. *(Aids to Anatomy.)*

6. "The *Ligamentum nuchæ* is a fibrous membrane which, in the neck, represents the supraspinous and interspinous ligaments of the lower vertebræ. It extends from the external occipital protuberance to the spinous process of the seventh cervical vertebra. From its anterior border a fibrous lamina (fascia nuchæ), is given off, which is attached to the external occipital crest, the posterior tubercle of the atlas, and the spinous process of each of the cervical vertebræ, so as to form a septum between the muscles on each side of the neck. In man it is merely the rudiment of an important elastic ligament, which, in some of the lower animals, serves to sustain the weight of the head." (Gray's *Anatomy.*)

7. PECTORAL MUSCLES. (1) *Pectoralis major* arises from sternal half of clavicle, front of sternum, cartilages of upper six ribs, aponeurosis of external oblique muscle of abdomen; inserted into outer ridge of bicipital groove of humerus. Nerve supply: External and internal anterior thoracic.

(2) *Pectoralis minor* arises from 3d, 4th and 5th ribs outside cartilages, aponeurosis over intercostal muscles; inserted into anterior half of superior surface and inner border of coracoid process of scapula. Nerve supply: Internal anterior thoracic.

Subclavius arises from first rib at junction of bone and cartilage; inserted into groove on under surface of clavicle between the two tubercles. Nerve supply: Branch from 5th and 6th cervical.

8. *The brachial artery* is the continuation of the axillary, begins at the lower margin of the insertion of the Teres major, passes down the anterior aspect of the arm, and terminates about half an inch below the bend of the elbow, where it bifurcates into the radial and ulnar arteries. It passes along the inner borders of the Coracobrachialis and Biceps muscles, it is superficial throughout

its course, is accompanied by venæ comites, and at about its center is crossed by the median nerve, which passes from the outer to the inner side of the artery.

Branches: Superior profunda, inferior profunda, nutrient, anastomotica magna, and muscular.

9. BOUNDARIES OF THE POPLITEAL SPACE. *Externally, above:* By the biceps. *Externally, below:* By the plantaris and external head of the gastrocnemius. *Internally, above:* By the semimembranosus, semitendinosus, gracilis, and sartorius. *Internally, below:* By the inner head of the gastrocnemius.

Contents: Popliteal artery and vein, external and internal popliteal nerves, termination of external saphenous vein, small sciatic nerve, articular branch from obturator nerve, lymph glands, and loose adipose tissue.

10. Skin, fascia, linea semilunaris, subserous areolar tissue, and peritoneum.

PHYSIOLOGY AND HYGIENE.

1. The *normal temperature* of the body is between 98° and 99° F.

Two physiological reasons for increased temperature: Muscular exercise, and ingestion of food.

2. *Function of lymph:* (1) It conveys nutriment to all cells not directly reached by the blood; (2) in the intestines, it absorbs nutrient material (chiefly fat) and pours it into the blood stream for distribution; (3) it takes certain waste matters to the blood to be later eliminated by the lungs, kidneys, and skin.

Function of chyle is to absorb nutrient material (chiefly fat) from the intestine and pour it into the blood stream for distribution.

3. *Normal urine* is a yellowish fluid, secreted by the kidneys, to the amount of about 1200 to 1500 c.c. daily; specific gravity, about 1015 to 1025; acid reaction (due to acid sodium phosphate); it has a characteristic odor, and a salty taste.

4. *Movements of the stomach.* "When devoid of food the stomach remains in a condition of slight tonic contraction, the mucous membrane being thrown into folds. *X-ray* observations have shown that in the empty condition only the pear-shaped upper third of the stomach contains gas, the rest of the organ passing to the pylorus in the form of a collapsed tube, which corresponds in position to the small curvature of the filled stomach. Food when swallowed causes relaxation of the walls of the stomach. Moreover, the food introduced at different times bears different relations with regard to the stomach walls. That is to say, food first introduced is spread round the stomach, forming a lining to the mucous membrane. Food in-

troduced later is retained encapsuled like a ball by its enveloping layer of mucin. This fact is of extreme importance, for the later food is protected from the gastric juice, and the admixed saliva, which is inactive in an acid medium, is enabled to prolong its activity. Cannon maintains that salivary digestion may proceed even for an hour or more after the food is in the stomach. Soon after the introduction of food into the stomach, movements begin. These proceed at first very gently, but later on increase in intensity. They are confined entirely to the pyloric portion of the stomach. Cannon, by his recent feeding experiments with bismuth subnitrate and *X*-ray observations, has succeeded in observing the movements of the stomach very closely. They consist of a series of contractions, which proceed in a peristaltic manner. The sphincter at the commencement of the pyloric vestibule contracts, in a ring-like manner, and this contraction is propagated over the pyloric portion. The time taken in transit is twenty-six seconds (in the cat), and the successive contractions follow one another at ten second intervals. By this means the food in the pyloric region of the stomach is thoroughly disintegrated and mixed with the gastric juice. When this condition is reached the pylorus is relaxed at certain intervals and portions of the acid chyme are ejected into the duodenum. Immediately succeeding this the pylorus again enters into tonic activity. The relaxations of the pylorus coincide with the arrival at that place of a wave of contraction, although they are irregular; for every peristaltic wave there is a corresponding pyloric inhibition. The mechanism of pyloric regulation will be discussed later. It is in the pyloric vestibule of the stomach that the food is so thoroughly mixed with the gastric juice, and it is here also that solid food is most likely to injure the mucous membrane of the stomach, and so predispose to the formation of gastric ulcer. So far no mention has been made of the functions and movements of the fundus and body of the stomach. These portions do not undergo contractions in rhythmic series, but the musculature enters into a condition of maintained strong tonicity. The function of this is obvious, and is to replenish the pyloric triturating apparatus with further materials from the fundus and body store." (Lyle's *Physiology.)*

5. ***Wallerian degeneration:*** "When a nerve is divided the first result is a loss of its function. Inasmuch as each nerve-fiber develops from a cell which later nourishes it, if the connection between the two is severed the nerve-fiber undergoes Wallerian degeneration, and in the case of a nerve which is made up of nerve-fibers the whole nerve undergoes this change. This degeneration consists, in the case of medullated nerves, in the death of the axis-

cylinder, the breaking up of the medullary sheath into drops of myelin, which are later absorbed, and the multiplication of the nuclei of the primitive sheath. In non-medullated nerves the only result is the death of the axis-cylinder. Degeneration begins very soon after the section —within a day or two—and throughout the entire severed portion of the nerve at the same time. Thus the course of a nerve, or a collection of nerves, may be traced throughout its entire extent. These changes are believed to be due to the severance of the nerve from its trophic center. If an anterior root of a spinal nerve is divided, the distal end, being separated from the gray matter of the cord which is its center of nutrition, undergoes degeneration, while the end which remains connected with the cord retains its integrity. If a posterior root is divided between the cord and the ganglion, the degeneration takes place between the cord and the ganglion; while if divided below the ganglion, the degeneration takes place in that portion separated from the ganglion, showing that the ganglion is the nutritive center for the posterior root." (Raymond's *Physiology.*)

This method is made use of in studying the course of a tract of nerve fibers, as follows: "Sections of the cord in which the degeneration has taken place are stained with Marchi's solution; the degenerated fibers stain black, while the other portion remains practically unstained. A tract in which this degeneration takes place below the injury or point of section is a *descending tract,* and the degeneration is a *descending degeneration;* while a tract in which the process occurs above the lesion is an *ascending tract,* and the change, an *ascending degeneration.*" (Raymond's *Physiology.*)

6. "The oxygen in the various under-mentioned media has the following partial percentage pressures of an atmosphere:

Atmospheric air.....	20.96	per cent.
Alveolar air.....	18.00	"
Arterial blood plasma.....	14.00	"
Tissues of the body.....	0.00	"

What then takes place is this: The oxygen (being a fluid) flows from the place of high pressure to the place of low pressure, and hence diffuses down from the inspired atmospheric air into the alveoli. From the alveoli it now passes through the thin endothelial lining of the alveolus, and the thin endothelial lining of the capillary into the blood plasma. It continues to accumulate in the blood plasma until it has a partial percentage pressure of 14 per cent. of an atmosphere, and it then begins to combine with hemoglobin in the red-blood corpuscles, and so the partial percentage pressure of the oxygen in the blood plasma

falls below 14 per cent. of an atmosphere. More oxygen now passes into the blood plasma, raising the partial percentage pressure once more to 14 per cent., and then more oxyhemoglobin is formed. Finally, in this way, nearly the whole of the hemoglobin is converted into oxyhemoglobin. The oxygen passes again from the blood plasma (the place of high pressure) to the tissues (the place of low pressure). In this way its partial percentage pressure in the blood plasma becomes less than 14 per cent. of an atmosphere, and therefore at once the oxyhemoglobin breaks up into oxygen and hemoglobin. This oxygen, passing into the blood plasma, raises its partial percentage pressure once more to 14 per cent. of an atmosphere, and then oxygen begins once more to pass to the tissues from the blood plasma, and oxyhemoglobin to be broken down into oxygen and hemoglobin." (Lack's *Introduction to Physiology.*)

7. *Healthful preservatives for food* are: Drying, exclusion of air and exposure to cold.

8. *Diseases to be reported to the board of health:* Measles, German measles, scarlet fever, smallpox, chickenpox, typhus, relapsing fever, croup, diphtheria, typhoid, Asiatic cholera, tuberculosis, plague, tetanus, anthrax, glanders, epidemic cerebrospinal meningitis, leprosy, trachoma, suppurative conjunctivitis, puerperal septicemia, whooping cough, yellow fever, malaria and any other diseases that may be ordered by the board of health.

Why? (1) To prevent the spread of such diseases, and so to preserve the health of the community; and (2) because neglect to report the same will render the physician liable to penalty.

9. *Sources of bacteria in milk:* The milk itself; the animal from which the milk is obtained; the surface of the udder, the hands of the milker, the cans and containers, the water used for washing the cans or for adulterating the milk, and dirt from any extraneous source.

Control can only be obtained by cleanliness, constant and rigid inspection, with prompt punishment for infraction of sanitary rules.

10. *Characteristics of a good (drinking) water:* (1) It should be clear and limpid. Cloudy and muddy waters should be avoided. (2) It should be colorless. A greenish or yellowish color is usually due to vegetable or animal matter in solution or to organisms. (3) It should be odorless; especially free from sulphuretted hydrogen or putrefactive animal matter. (4) It should not be too cold, but should have a temperature of from 46° F. to 60° F. (5) It should have an agreeable taste; neither flat, salty, nor sweetish. A certain amount of hardness and dissolved gases give a sparkling taste. It should contain from 25 to

50 c.c. of gases per liter, of which 8 to 10 per cent. is carbon dioxide and the rest oxygen and nitrogen. (6) It should be as free as possible from dissolved organic matter, especially of animal origin. (7) It should not contain too great an amount of hardness. A certain quantity of saline matter is necessary, however, to give it a good taste. It should not contain over three or four parts of chlorine in 100,000 parts of water. (From Bartley's *Chemistry*.)

CHEMISTRY.

1. A *solid* is a form of matter in which the relative positions of the molecules are fixed and constant. In a *liquid* the molecules glide past each other and the substance assumes the form of its container. In a *gas* the molecules tend to get away from each other and to occupy a greater space. In a *solid* both volume and form are definite; in a *gas* both volume and form are indefinite; and in a *liquid* the volume is definite and the form is indefinite.

2. *Capillary attraction* is the force which causes fluids to rise through very fine tubes or through the pores of a loose material. The term is derived from the Latin *capillaris*, which means *like a hair;* and capillary attraction is so called because it is best exhibited in fine tubes like hairs.

3. *Electrolysis* is the process of electrical conduction accompanied by the separation of the constituents of the electrolyte, or the decomposition of a chemical compound by passing an electric current through it. The primary products of electrolysis are called ions; those which separate at the positive electrode or anode are called anions; those which separate at the negative electrode or cathode are called cations.

4. *Baking powders*, when pure, should consist of cream of tartar, sodium bicarbonate, and a little flour. *Adulterations* employed are: Alum, acid calcium phosphate, potassium chloride, ammonium carbonate. Baking powders *act* by the decomposition of the $NaHCO_3$ by the cream of tartar, with sudden liberation of CO_2, minute bubbles of which permeate the dough and increase its porosity. (From Scott's *State Board Chemistry*.)

5. *Chemical affinity* is that force which unites atoms together to form molecules; hence, it is the force which unites the two atoms of hydrogen and one atom of oxygen in the molecule of water, H_2O.

6. *Distillation* consists in vaporizing the water and subsequently condensing it by means of cold, and then collecting. By this means water is obtained chemically pure.

Filtration effects the separation of all particles of un-

dissolved suspended matter, without any alteration of substances that are held in solution.

7. The addition of water to the modern tincture of iodine has no effect beyond diluting it; this is due to the presence of potassium iodide. In the absence of this latter, an insoluble precipitate would be formed. The "practical aplication" to be drawn is, obviously, not to add water or anything else to any substance without knowing what the result will be.

8. Potassium hydroxide acts as a caustic, disintegrates the tissues, and may corrode or perforate the stomach. It is a corrosive rather than a poison. Antidotes are: Dilute vinegar, neutral oils, milk.

9. Zinc sulphate is incompatible with the vegetable astringents, because a mixture of the two would cause a precipitate.

10. Uric acid occurs in the urine, in calculi, in chalky deposits or tophi in the joints of the gouty, in the blood, liver, and spleen. It occurs chiefly as the disodic salt.

PATHOLOGY AND DIAGNOSIS.

1. The germ of syphilis is the *Treponema pallidum*, also called the *Spirochæta pallida*. It is a slender spirillum, with regular turns, the curves varying in number from three or four to twelve or even twenty; it is about 4 to 20 mikrons long, actively motile, with a fine flagellum at each pole; it is flexible, hard to stain, and has not been cultivated on artificial media. How it divides is not known. It stains best with Giemsa's eosin solution and azur.

2. *Pancreatic calculi* are due to microorganisms, following inflammation of the gland or duct.

Symptoms are: Pain in the region of the pancreas, fatty stools, glycosuria, and emaciation.

3. The spotted fever of the Rocky Mountains is said to be caused by a piroplasma in the blood, and to be conveyed by ticks. The disease is characterized by chill, fever, pain in back, and a macular rash; hemorrhage may occur from mucous membranes. It has been found in Montana, Idaho, Wyoming, and Nebraska.

4. The *Gonococcus* is a diplococcus with a special predilection for the mucous membrane of the urethra and vagina. It is sometimes found on the conjunctiva. The appearance is that of two coffee beans; the gonococcus is found in the pus cells, stains with ordinary anilin dyes, but not by Gram's method. It is aërobic, and can be cultivated on human blood serum; it will not grow on gelatin, agar, bouillon, or potato. It was discovered by Neisser.

To demonstrate *gonococci:* On a cover-glass make a smear with the discharge as thin as possible, and let it

dry in the air; cover it with a freshly made solution of anilin-oil-gentian-violet for one or two minutes; wash it in distilled water; leave it in Gram's solution for two minutes; wash it in 95 per cent. alcohol until decolorized; wash it in distilled water; counterstain with a dilute carbolfuchsin without heat, or with a saturated aqueous solution of Bismark brown; wash in distilled water, dry with filter paper, mount, and examine with an oil-immersion lens. The gonococci will appear as *diplococci within the leucocytes,* which have been *decolorized by Gram's stain,* and have taken the counterstain

5. HEMOTHORAX. *Causes:* Pleurisy (particularly when tuberculosis, cancer, or scurvy, is also present), wounds of chest wall, rupture of an aneurysm, fracture of ribs.

Symptoms: Chill, fever, pain in side, dry cough, dyspnea.

6. *Elephantiasis* is characterized by large and swollen skin and tissues, due to obstructed lymphatics, the latter caused by filaria. Legs, scrotum, and breast are affected. There is much hyperplasia, later a stage of warty growth.

7. *Hodgkin's disease* is characterized by enlarged lymphatic glands, anemia, emaciation, cachexia, fever. The cause is unknown.

8. *Disease of coronary arteries.* "The symptoms are often exceedingly obscure and seldom so distinctive as to justify a positive diagnosis during life. Complete closure of one of the coronary arteries may end life instantly. When both coronary arteries are the seat of arteriosclerosis, sudden death may follow thrombosis with only partial closure of either. Sometimes the sudden fatal termination is due to rupture of the heart-wall at the site of an anemic necrosis. In cases which are not immediately fatal the heart's action becomes feeble and disturbed in rhythm, the pulmonary engorgement producing cough and dyspnea. Attacks of angina pectoris occur, and death often takes place during one of them, sometimes even in the first attack. In other cases the patient suffers repeated seizures during a number of years. When the obstruction of the coronary circulation is but partial, the heart muscle undergoes a slower degeneration and the symptoms are of moderate severity." (French's *Practice of Medicine.)*

9. *Hay fever* is a hypersensitive condition of the upper air-passages, with intense catarrhal symptoms, mostly occurring in the autumn or spring, and probably due to the inhalation of irritating particles in the atmosphere or some pathologic condition of the upper air-passages. It frequently recurs at the same period of each month for successive years. The onset is sudden, and generally begins with sneezing, coryza, nasal stenosis, headache, burning sensation in the nasal chambers, and an excessive whitish

mucoid secretion. Lacrimation, burning of the eyeballs, conjunctivitis, hacking cough, asthmatic attacks, and depression may be present.

10. *Symptoms of brain tumor:* Persistent headache, vertigo, projectile vomiting, choked disc, convulsions, stupor, and focal symptoms depending upon the place of the growth.

THERAPEUTICS.

Cheyne-Stokes respiration "is a condition in which the respirations gradually increase in volume and rapidity until they reach a climax, when they gradually subside, and finally cease for from ten to forty seconds, when the same cycle begins again. It may occur in tubercular meningitis, cerebral hemorrhage, embolism, thrombosis, aneurysm of basilar artery, uremia, heart disease, etc." (Hughes' *Practice of Medicine.*)

2. *Sciatica* may result from neuritis, rheumatism, gout, exposure to cold and wet. *The treatment* consists in rest and the administration of the salicylates, potassium iodide, quinine, antipyrine, etc. Various forms of counterirritation along the line of the nerve are beneficial. Cocaine (gr. ⅛-¼) may be injected into the nerve and acupuncture may be performed. Electricity may be tried, and, as a last resort, stretching of the nerve may be necessary. Opium is often required for relief of the pain.

3. *Chronic interstitial nephritis. Symptoms:* The infection is insidious in its outset and may be attended with dimness of vision, albuminuric retinitis, headache, dropsy, hypertrophy of the left ventricle of the heart, and uremia. The characteristic features of the urine are the large quantity, low specific gravity, few hyaline casts and oil drops, and albumin which is not constant. Arteriosclerosis is nearly always present and is more or less characteristic. The prognosis is unfavorable as to recovery. *The treatment* should be directed to the cause, and in addition the diet and hygiene should receive attention. The food should be largely of milk, vegetables, and fruit. High arterial tension should be controlled by nitroglycerin and aconite. The bowels should be always kept free. Diuretics are not indicated so long as secretion is free. The recurrence of uremia will require special treatment. *(Pocket Cyclopedia.)*

4. *Ulcer of stomach.* The symptoms are localized pain, vomiting, hematemesis, gradual loss of flesh and strength, dyspepsia, grave anemia, and excessive secretion of hydrochloric acid. The complications are perforation, death from inanition, and cicatrical contraction, causing obstruction. The prognosis is guardedly favorable.

The treatment consists largely in rest in bed, liquid diet and sometimes rectal alimentation only. The rectum should first be irrigated with lukewarm water, and the following nutritive enema may be given: Milk, ℥8; yolks of *2* eggs; sodium chloride, ʒ1; claret wine, ʒ1; and a tablespoonful of aleuronat flour. Hematemesis will require absolute rest and abstinence from food and drink. Thirst may be relieved by sponging the lips and tongue with ice-water. Ice-bags may be applied over the affected area, and ergotol (♏20) with morphine (gr. ¼) may be given hypodermically. Later light diet and silver nitrate may be administered.

5. *Bell's palsy* is an acute paralysis of the facial nerve; it may be caused by exposure to cold, injury or disease of the middle ear, syphilis, tabes, gout, tumors of parotid, hemorrhage or softening or tumors of the brain.

6. *Tetanus.* The early symptoms include difficulty in swallowing, stiffness in the movement of the jaw, and pain. Spasms then begin in the muscles of the back, abdomen, limbs, and face, and the jaw becomes locked. The spasms increase in severity and become universal. Profuse sweating usually occurs during the paroxysm and the temperature may undergo marked variations. The acute form usually terminates fatally from exhaustion, but the progress of the chronic variety is more favorable. The treatment consists in absolute rest in bed, with perfect quiet, in a darkened room. Iron, quinin, brandy, whisky, and nutritious food should be given to sustain the patient. The spasms may be controlled by the administration of opium, chloral, chloroform, hyoscin, potassium bromide, amyl nitrite, physostigma, etc. Antitetanic serum (dose, c.c. 15 twice daily) may be employed hypodermically.

7. ERGOT. *Therapeutic indications:* To promote uterine contractions during third stage of labor; fibroids, menorrhagia, postpartum hemorrhage. Some forms of amenorrhea and dysmenorrhea, dysentery, arterial hemorrhage, congestive headache, laxity of sphincters, of bladder or rectum, hemorrhoids, aneurysm, diabetes, urinary incontinence, direct paralysis of the sphincter vesicæ, atonic spermatorrhea.

Acute ergotism. "In a large dose ergot acts as a gastro-intestinal irritant, causing nausea and vomiting, gastralgia, colic, thirst, and purging. It slows the heart, raises the arterial tension greatly, dilates the pupils and produces pallor, vertigo and frontal headache. It stimulates the contraction of unstriped muscular fiber, especially affecting the sphincters and causing contraction of the sphincter of the bladder, making micturition difficult if not impossible. It produces cerebral and spinal anemia, a great fall of the body-temperature, coldness of the surface, tetanic

spasms, and violent convulsions."—(Potter's *Materia Medica*, etc.)

Chronic ergotism "occurs in two forms, the convulsive and the gangrenous—either usually excluding the other. The convulsions are tetanoid spasms of the flexor muscles, the uterus, the intestinal fibers, and the muscles of respiration, ending in coma and death by asphyxia. The gangrenous form begins with coldness and numbness of the limbs, formication of the skin all over the body, loss of sensibility and abolishment of the special senses, bullæ of blood and ichor, followed by dry or moist gangrene of the lower extremities, buttocks and other parts, epileptiform convulsions, coma and death. Autopsies show changes in the posterior columns of the cord, resulting probably from spinal anemia." (Potter's *Materia Medica*, etc.)

8. CHLORAL HYDRATE. *Therapeutics:* It is used as a hypnotic and antispasmodic; it is useful in mania and delirium tremens; as a gastric antiseptic and sedative, also in epilepsy and neuralgia; it is a useful antipruritic, and is a good application for sores and ulcers; it is the antagonist in strychnine poisoning.

Symptoms of a toxic dose are: Deep sleep, muscular relaxation, lowering of body temperature, and abolition of reflexes and sensibility.

9. *Causes of enlargement of the spleen: "Excessive chronic enlargement* is most frequently due to leukemia, splenic anemia, or chronic malaria; lesser degrees may be met with in cirrhosis of the liver, rickets, pernicious anemia, passive congestion, or actual portal obstruction. *Acute enlargement* is most often encountered in septicemia, malarial fever, typhoid and typhus, erysipelas, acute miliary tuberculosis, tuberculous peritonitis, cerebrospinal meningitis, smallpox, diphtheria, scarlet fever, relapsing fever, infarct, plague and certain other tropical diseases. (Green's *Medical Diagnosis.*)

10. It is generally of sudden onset; severe epigastric pain, irregular vomiting, fever, chills, meteorism, and collapse may be present.

OBSTETRICS.

1. During pregnancy the uterus first descends, then rises, and becomes anteflexed. It continues to rise till about two weeks before labor, when it sinks.

2. *Morning sickness* is a form of nausea (and sometimes vomiting) occurring early in the morning during pregnancy; it usually begins at about the fourth or fifth week, and lasts till about the fourth month. It is a sympathetic disturbance. No treatment is demanded. There is another

variety called the *Pernicious vomiting of pregnancy;* this is occasionally seen in pregnancy, and becomes "so excessive as to threaten the patient's life. It may arise from a variety of causes. The most common are: Reflex disturbance, caused by the rapid growth and distention of the uterus; some pathologic condition of the uterus or its adnexa; some pathologic condition of the gastrointestinal tract; excessive sexual intercourse; kidney insufficiency. The principal symptom is continuous vomiting, which results in exhaustion and death unless relieved. The outlook is very grave.

The treatment consists in rest in bed in a quiet, darkened room and the administration of easily digested foods, such as milk, broths, eggs, etc. A careful search must be made for some local exciting cause, and if any such condition is found it should receive appropriate treatment. Sexual intercourse should be interdicted. The bowels should be kept freely open. Sodium bromide, camphor, cocain, silver nitrate, cerium oxalate, hyoscin hydrobromate, antinyrin, etc., are among the drugs used internally. Rectal alimentation may be necessary, and, as a last resort, dilatation of the cervix and internal os, or abortion may be performed." (Gould and Pyle's *Pocket Cyclopedia.)*

3. Headache, nausea, and vomiting, epigastric pain, vertigo, ringing in the ears, flashes of light or darkness, double vision, blindness, deafness, mental disturbance, defective memory, somnolence; symptoms easily explained by the circulation of toxic blood through the nerve centers. These may be preceded by lassitude, and accompanied by constipation, or by diarrhea. Headache is perhaps the most significant and common warning symptom. In bad cases the urine is reduced in quantity (almost suppressed), very dark in color, its albumin greatly increased, so that it becomes solid on boiling.

4. Persistent hemorrhage, dilated os, pains, uterine contractions, softened cervix, obliteration of the anterior angle between neck and body of uterus.

5. *Dangers to the mother during the second stage of labor* are: Syncope, hemorrhage, rupture of uterus, eclampsia.

6. *Symptoms of death of the fetus* during the later months of pregnancy are: Cessation of the signs of pregnancy, the abdomen and uterus are both diminished in size, the fetal heart sounds and movements cease, there is no pulsation in the cord, the mother's breasts become flaccid and occasionally secrete milk. If the fetus has been dead for some time crepitus of its cranial bones may be elicited.

7.

PRIMIPARA.	MULTIPARA.
The fourchet is present.	The fourchet is missing.
The perineum is tense and deep.	The perineum is relaxed and probably torn.
The labia are in apposition.	The vulva is frequently patulous.
The vagina possesses tonicity, and is rough and rugous, with a granular feel.	The vagina is relaxed and smooth.
The cervix is long, soft, and conical; the os is undilated.	The cervix is large, cylindrical, short, not so soft, and probably lacerated; the os is patulous.
The abdomen is full, rounded, tense, and resisting to the touch.	The abdominal walls are relaxed and non-resisting to the touch; the skin is loose and wrinkled.
Dark, purplish-red striæ appear late in pregnancy.	The striæ may be both white and livid, the former being present from the beginning of pregnancy.
The breasts are full, firm, and sensitive to pressure.	The breasts are flabby, pendulous, and non-sensitive to pressure.
The nipples are usually small and undeveloped or even inverted.	The nipples are large and well developed.
Striæ are absent upon the breast.	Striæ are frequently to be found.

—(From Dorland's *Obstetrics.*)

8. *The indications for Podalic Version are:* (1) In transverse presentations; (2) in placenta prævia; (3) in malpresentations of the head; (4) in simple flattened pelvis, and in minor degrees of pelvic contraction; (5) in prolapse funis; (6) in sudden death of the mother; and (7) in any case where speedy delivery is imperative.

9. *Conditions of the mother which might be mistaken for pregnancy:* Ascites, ovarian cysts, uterine fibroids, other pelvic tumors, subinvolution of uterus, pseudocyesis, hematometra, amenorrhea, obesity, over-distended bladder.

10. *Treatment of placenta prævia:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchement forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

SURGERY.

1. *To reduce dislocation of inferior maxillary bone:* The surgeon places his thumbs, well protected by a towel, on the molar teeth or behind them, presses the angles of the jaw downward while he elevates the chin with his fingers; and by this manipulation the condyles of the jaw usually slip back into place with a snap. After reduction of the dislocation the jaw should be fixed for a week or ten days by a Barton's bandage or a four-tailed sling.

2. *Colles' fracture* is a transverse fracture at lower end of radius; it is due to falls on the outstretched palm. The line of fracture is about an inch above the wrist, and runs obliquely downwards from behind. The lower fragment is driven backwards and upwards, and rotated to the radial side, carrying the hand with it into the position of abduction, and leaving the tip of the radius at the same level as, or higher than, the tip of the styloid process of the ulna. The internal lateral ligament of the wrist is ruptured or the styloid process torn off. The fracture is usually impacted, the upper fragment being driven into the lower. The deformity is characteristic, viz.: (1) the hand is abducted; (2) the styloid process is on the same level as, or lower than, the tip of the radius; (3) the upper end of the lower fragment projects above the back of the wrist; on the front is a corresponding depression, while above it the upper fragment projects forward. Union occurs readily, but it is common to get deformity and adhesions about the site of fracture. *Treatment:* Disimpaction and reduction are brought about by grasping the hand by the "shaking-hands" grip, extending and adducting the hand and lower fragment. The arm is then fixed on a splint. It is very important in this fracture to start massage and passive movement not later than the end of the first week, to prevent stiffness. Union is firm in three weeks. *(Aids to Surgery.)*

3. ***Sources of wound infection:*** Air; water; patient's skin, hair, or clothing; hands of surgeon, assistants, or friends; instruments and dressings; solutions; insects.

4. ***Shock*** is the name given to a sudden and general depression of the vital powers, due to some strong stimulation (such as injury or emotion), acting on the vital centers in the medulla and producing vasomotor paralysis. Shock is *primary* when the symptoms appear promptly; it is *secondary* when the symptoms don't appear for several hours (often observed after railway accidents, intoxication, etc.).

5. The saline solution is 0.6 per cent. "A vein of the patient, at the elbow, should be exposed, and should have placed under it, about one-half inch apart, two catgut

ligatures; the distal ligature is then tied and an opening is made into the vein between the ligatures; a canula is next inserted into the opening in the vein, and is secured in position by tying the proximal ligature. The canula is first filled with the saline solution, and is then connected with a funnel by means of a rubber tube, which is filled with saline solution to displace the air, and upon raising the funnel above the part the solution enters the vein; care should be taken to see that the funnel is kept well supplied with the solution until a sufficient quantity has been introduced. The quantity introduced is regulated by the condition of the patient's pulse." (Wharton's *Minor Surgery.)*

Dangers of the operation are: Entrance of air into the vein, dyspnea, cyanosis, sepsis.

6. A U-shaped flap is made including all the structures down to the bone. The base of the flap should be so situated as to contain a sufficient blood-supply, and the flap should be so planned as to favor drainage from the wound. When the bone has been exposed, the trephine is placed with the center pin projecting about one-sixteenth of an inch, and the instrument is turned from right to left until a groove is made in the bone; the trephine is then removed, and the center pin is raised so that as the teeth of the trephine approach the inner table of the skull the point of the center pin will not injure the membranes or brain. The instrument is then reapplied and worked cautiously as the groove in the bone is deepened. When the diploë is reached, there is usually some bleeding from the wound, and as the trephine approaches the inner table of the skull it should be manipulated with great care, and when the resistance is felt to diminish at any one part of the bone the trephine is made to cut at other points of the bone where resistance is still apparent. When the disk is completely cut through, it may be lifted out in the crown of the trephine or may be removed with forceps or an elevator. (Wharton.) The place is generally one and a quarter inches behind the external angular process of the frontal bone, on a level with the upper margin of the orbit.

7. Removal of mammary gland, all involved or possibly involved lymphatics, and pectoral muscles. Halsted's operation, for example.

8. "*Cholecystotomy,* or opening the gall-bladder to remove stones or drain it, is done through an incision parallel to and 1½ inches below the costal margin over the gall-bladder. The liver is drawn up and the intestines packed away with gauze. If the gall-bladder is distended, the fluid is removed by tapping it with a trocar and cannula. The opening is then enlarged, and the stones are removed with a scoop. The bile-ducts are examined along their whole course by a finger externally, and by a long probe

internally. If the interior is fairly healthy, the opening is sutured with two layers of continuous sutures and the abdomen is closed. Usually it is necessary to drain the gall-bladder for a time, in which case the margins of the opening are stitched to the peritoneum and transversalis fascia of the abdominal wound. The fistula thus established soon closes if there is no obstruction to the passage of the bile into the intestine. If not, it must be closed by a plastic operation or cholecystenterostomy." *(Aids to Surgery.)*

9. *Bassini's operation:* "An incision 2½ inches long is made over the inguinal canal, exposing the structures of the cord and the external oblique. The external oblique fibers are split from the apex of the external ring to expose the canal. The sac is found, opened, emptied of its contents, and isolated from the structures of the cord up to the internal ring. If the hernia is irreducible, the intestine is freed and returned to the abdomen, omentum being ligatured and removed. The neck of the sac is then transfixed and tied with silk, and the fundus removed. The stump returns to the abdomen, three or four stitches are then passed through the conjoined tendon and arched fibers of the internal oblique and transversalis muscles above, and the deep part of Poupart's ligament below. These are tied behind the cord. The external oblique is then sutured in front of the cord, leaving just sufficient opening for it to pass through without pressure. The skin is then closed by a continuous stitch. The patient should be kept in bed for three weeks, and should not exert himself for at least six weeks. If the wound has suppurated, or if the case is one in which the abdominal muscles are weak, it is advisable that a light truss should be worn afterwards for six months." (From *Aids to Surgery.)*

10. *Peritonitis* will show chills, rigor, fever, intense pain, dorsal decubitus with flexed thighs, rapid pulse.

Impaction of feces shows shock, slight fever, or subnormal temperature, vomiting, Hippocratic facies.

STATE BOARD EXAMINATION QUESTIONS.

New Jersey State Board of Medical Examiners.

ANATOMY.

1. Describe the endocardium.

2. Give origin, branches, and parts supplied by the musculospiral nerve.

3. Name five muscles of the shoulder and arm. Give origin, insertion, and action of any *one* of the five.

4. Name the muscles attached to the great trochanter of the femur.
5. What are the functions of the superior mesenteric veins?
6. Mention an anastomosis between the portal and systemic veins.
7. Name, locate, and describe the largest of the cranial ganglia.
8. What nerves supply the knee-joint?
9. In what respect do the pulmonary differ from other veins?
10. Describe the facial vein. Name its tributaries.
11. Describe the long saphenous vein.
12. What muscles (*a*) elevate, (*b*) depress the os hyoides and the larynx?
13. In fracture of the shaft of the radius near its center, what muscles are involved in displacement of the fragments?
14. Name and describe the different glands of the stomach.
15. In what way do the axillary and deep cervical glands communicate with each other?

PHYSIOLOGY.

1. What chemical change is necessary for blood coagulation?
2. Is the alkalinity of the blood increased or diminished by exercise, lactation, or digestion, and why?
3. State the normal amount of blood in a man weighing 160 pounds. How is it renewed after hemorrhage?
4. What is absorption, and by what process is it accomplished?
5. What conditions favor, and what conditions retard, absorption?
6. State the origin and function of lymph. Is it coagulable, and why?
7. What tissues and organs are developed respectively from the ectoderm, mesoderm, and entoderm?
8. What are the Wolffian bodies, and what becomes of them?
9. Discuss the corpus luteum. Does it indicate pregnancy? Explain.
10. What principal centers are located in the medulla?
11. What are the functions of the brain membranes?
12. Compare the functions of the white and gray matter in the encephalon.
13. Name, *in order of importance*, the organs in which animal heat is developed.
14. What variations of temperature are found in different parts of the body? Why?

15. Can a man live on an exclusively meat diet? Why?

MATERIA MEDICA AND THERAPEUTICS.

1. What remedies may be used to induce emesis? Give dose of each.
2. Name three mineral acids with therapeutic properties of each.
3. State uses and doses of salol, guaiacol, and heroin.
4. Give the source and physiological action of opium; name four preparations with adult dose of each.
5. Define alteratives; name five used in medicine with the therapeutic properties of each.
6. Compare the physiological action of aconite and digitalis; give adult dose of each.
7. Describe symptoms of ptomaine poisoning; outline the treatment.
8. Differentiate the effects of strychnine, nitroglycerin, and strophanthus on the arterial system.
9. Mention three vegetable and three mineral astringents with adult dose of each.
10. Specify the precautions to be used in administering chloroform; give reasons therefor.
11. Diagnosticate uremic poisoning; outline an eliminative treatment.
12. Explain the action and effects of phenacetin; give adult dose.
13. Prescribe in proper form for chronic bronchitis in an adult; explain the action of the ingredients used.
14. Enumerate the official preparations of arsenic; state the dose of each.
15. Give three examples of animal extracts with indications for the use of each.

CHEMISTRY.

1. (*a*) How does uric acid form in the system (*b*) Of what are gout stones principally composed? (*c*) What is the solubility of uric acid?
2. (*a*) State the origin of tartaric acid and other tartrates. (*b*) Give chemical formula of cream of tartar. (*c*) Rochelle salt.
3. (*a*) What are fats chemically? (*b*) What becomes of the fats ingested and what is the province of adipose in the body? (*c*) Under what condition does fat occur in the urine?
4. (*a*) What is nitroglycerin? (*b*) How is it used in medicine and what is its effect on the vascular system?
5. (*a*) What is chloral hydrate? (*b*) How does chloral act as a poison?
6. (*a*) What is the difference between ferrous and ferric salts? (*b*) Give examples by formulas.

7. (*a*) What is potassium permanganate? (*b*) Give formulas and its action as a disinfectant.

8. (*a*) Which are the two iodides of mercury? (*b*) Give formulas. (*c*) What is the difference in action of the "ous" and "ic" compounds of Hg?

9. (*a*) Define the term hardness as applied to a potable water? (*b*) What does the presence of an abnormal quantity of chlorides in a drinking water indicate?

10. Name three pigments normally present in human urine.

11. (*a*) Name three univalent elements. (*b*) Name a monobasic, a dibasic, and a tribasic acid radical.

12. (*a*) Give source, symbol, valency, and atomic weight of bromine. (*b*) What is acidum hydrobromicum dilutum (U. S. P.)?

13. (*a*) What is oxalic acid? (*b*) For what salt is it liable to be mistaken? (*c*) Give treatment for poisoning by oxalic acid.

14. (*a*) What are the principal constituents of cow's milk? (*b*) Give chemical explanation of the souring and curdling of milk.

15. Name the alkaloids of belladonna, aconite, nux vomica, and opium.

HISTOLOGY.

1. Give composition of human blood.

2. Mention different leucocytes and derivation of names.

3. What are thrombocytes?

4. Give structure of the mucous membrane of the stomach.

5. What cells line the larynx, trachea, bronchi, and bronchioles?

PATHOLOGY.

6. Give rôle of white blood-cells in infection.

7. What is hemolysis?

8. Define agglutination. How produced?

9. Define atelectasis; give causes and effects.

10. What will cause and what are the effects of exclusion of bile from the intestines?

BACTERIOLOGY.

11. Give chemical composition of bacteria.

12. What are proteid bodies? Name varieties and describe them.

13. What substances must be supplied to bacterial cells for their food?

14. Mention other bacterial functions besides disease production.

15. What are the fermentations of milk? Which are innocuous and which harmful? State effects of pasteurizing and boiling.

PRACTICE OF MEDICINE.

1. Describe bubonic plague.
2. Differentiate tonic and clonic spasms.
3. Describe the different stages of syphilis.
4. Differentiate cystic and renal hematuria.
5. Give the causes and symptoms of cholelithiasis.
6. Give the causes and symptoms of edema glottidis.
7. Give four physical signs present in consolidation of lung tissue.
8. How would you determine high blood-pressure? What is its significance?
9. What, how much, and how often should a four-months-old bottle-fed baby be fed?
10. Differentiate ataxia and aphasia, and give the location of the lesion in each.
11. Where is bronchial breathing heard normally? What does it indicate when heard elsewhere?
12. What is the significance of (1) epithelial; (2) granular; (3) fatty, and (4) waxy casts in the urine?
13. Describe the prodromal symptoms, giving the duration of each, in (1) scarlet fever; (2) measles, and (3) small-pox.
14. Give three causes for specific gravity of the urine (1) under 1010, and (2) over 1030, and the significance of each.
15. Describe vesicular, papular, and pustular inflammation of the skin and name a disease of which each is characteristic.

OBSTETRICS AND GYNECOLOGY.

1. What are the characteristics of the female pelvis and how does the male pelvis differ therefrom?
2. Describe the vulva (*a*) of a virgin, (*b*) of a multipara.
3. Describe (1) the process of fecundation, and (2) the uterine changes resultant.
4. Describe pelvimetry and name the five most important measurements.
5. Describe Walcher's posture and its uses.
6. What precaution as to the urine should be employed in the case of a pregnant woman?
7. Differentiate accidental hemorrhage, placenta prævia, postpartum hemorrhage.
8. Describe fully the treatment you would use in postpartum hemorrhage.
9. How should asphyxia neonatorum be managed?
10. Cause, preventive treatment, and curative treatment of ophthalmia neonatorum.
11. What causes puerperal infection? How may it be prevented?

12. How do you prepare a patient for an operation which is to involve both the abdominal surface and the vagina?
13. What are the causes of pelvic abscess? Outline treatment.
14. Describe the menopause and name the diseases common to that period of life.
15. Differentiate vaginitis and vaginismus and give treatment of the latter.

SURGERY.

1. Diagnosis and treatment of perforation of intestine in typhoid fever.
2. Give etiology, diagnosis, and treatment of empyema of the frontal sinus.
3. Give symptoms and treatment of ischiorectal abscess.
4. Treatment of compound fracture of tibia and fibula.
5. Describe tertiary syphilis of the pharynx.
6. Diagnosis of embolism of the mesentery.
7. Mention the causes of incontinence of urine.
8. What are the symptoms of cerebral compression?
9. Describe in detail lumbar puncture.
10. Diagnosis and treatment of papilloma of the bladder.
11. Give indications for drainage.
12. Mention the causes and symptoms of stricture of the rectum.
13. Give treatment of tubercular peritonitis.
14. Give diagnosis of lipoma of the neck.
15. Give diagnosis and treatment of aneurysm of the femoral artery.

HYGIENE.

1. Define hygiene.
2. What would you advise a person to do that fears pneumonia, rheumatism, nephritis, insomnia?
3. What is absolutely necessary for the maintenance of the healthy functions of the body?
4. What is antiseptic? What is meant by the term disinfection?
5. Name five disinfectants.
6. Why does a heated atmosphere charged with moisture render sunstroke liable?
7. State the time that quarantine should be imposed in (*a*) diphtheria; (*b*) smallpox.
8. What instructions should be given a nurse respecting the prevention of the spread of scarlet fever from the sick room?

MEDICAL JURISPRUDENCE.

9. State the difference between criminal and civil malpractice.
10. Name some of the violent causes of death.

11. Give in detail the condition which would warrant the induction of abortion by the practitioner.
12. Define the word "insanity."
13. Name the post-mortem signs, external and internal, of recent drowning.
14. When is induced abortion lawful and what are the conditions in which it is called for?
15. In a case of suspected infanticide what are the evidences of live birth?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

New Jersey State Board of Medical Examiners.

ANATOMY.

1. The *endocardium* is a thin translucent membrane, consisting of a lining of endothelial cells which rest upon a fibroelastic tissue. The endothelial cells are flattened and nucleated, and are of an irregular outline. The subendothelial tissue consists of a network of white fibrous and yellow elastic tissues. A few involuntary muscle fibers (non-striated) may also be present.

2. Musculospiral nerve. *Origin:* Posterior cord of the brachial plexus. *Branches:* Muscular, cutaneous, radial, and posterior interosseous. *Parts supplied:* Muscles of back of arm and forearm; and skin of back of arm, forearm, and hand.

3. *Five muscles of shoulder and arm:* Deltoid, subscapular, teres major, biceps, and triceps.

Triceps: The long, or middle, head arises from a depression on the axillary border of the scapula immediately below the glenoid cavity; the external head from the root of the great tuberosity on the posterior surface of the humerus, and the upper part of the musculospiral groove; the internal head from the posterior surface of shaft of humerus, below musculospiral groove, and the internal and external muscular septa. It is *inserted* into the back part of the upper surface of the olecranon process of the ulna. *Nerve supply:* Musculospiral. *Action:* Extends elbow and forearm; and extends and adducts the shoulder.

4. *Muscles attached to the great trochanter of the femur:* Gluteus medius, gluteus minimus, pyriformis, obturator internus, obturator externus, gemellus superior, gemellus inferior, and quadratus femoris.

5. *The superior mesenteric vein* returns the blood from the small intestine, cecum, ascending colon, and transverse colon.

6. *An anastomosis between portal and systemic veins:* The superior hemorrhoidal vein, a branch of the inferior

mesenteric vein (portal), anastomoses with the middle hemorrhoidal vein, a branch of the internal iliac vein (systemic).

7. The Gasserian ganglion is situated in Meckel's hollow, near the apex of the petrous portion of the temporal bone. It is a ganglion on the fifth cranial nerve, and is adherent to the dura mater.

8. *Nerves that supply the knee joints* are derived from the obturator, anterior crural, external popliteal, and internal popliteal.

9. *The pulmonary veins differ from the other veins:* (1) They carry arterial instead of venous blood; (2) they have no valves; (3) they are but little larger than the arteries which they accompany; and (4) they accompany the pulmonary arteries singly.

10. The facial vein is formed by the union of the anterior facial and the anterior division of the temporomaxillary vein, under the angle of the jaw. It crosses the external carotid artery and empties into the internal jugular vein at about the level of the thyroid gland. Its *tributaries* the: Submental, inferior palatine, submaxillary, and ranine veins.

11. The *internal or long saphenous* begins at the inner end of the arch, on the inner side of the foot; it passes upward in front of the internal malleolus, then upward and backward with the internal saphenous nerve, behind the internal condyle of the femur, then upward and outward to the inner side of front of thigh, through the saphenous opening, to empty into the femoral vein.

12. *Muscles which elevate the os hyoides and larynx:* Digastric, stylohyoid, mylohyoid, and geniohyoid.

Muscles which depress the os hyoides and larynx: Sternohyoid, sternothyroid, thyrohyoid, and omohyoid.

13. The upper fragment is flexed and supinated by the biceps and supinator brevis; the lower fragment is drawn down and pronated by the two pronators.

14. Glands of the stomach are of two kinds: (1) *Fundus glands.*—These are branching glands with short ducts. Their epithelium is of two kinds. There is a continuous lining of cubical or polygonal cells which show granules in their inner part, the outer part being clear. These are the *principal, central,* or *peptic cells.* Scattered along the tube are large rounded cells, with a much greater affinity for acid dyes. These are the *parietal* or *oxyntic cells,* which are supposed to secrete the hydrochloric acid. They lie between the principal cells and the basement membrane. They are surrounded by a network of fine channels opening into a fine canal, which carries their secretion into the lumen of the gland.

(2) *Pyloric glands.*—The pyloric glands are longer, and

are more branched than the fundus glands. They are lined by principal cells only. Close to the pylorus the glands may extend through the muscularis mucosæ into the submucous coat.

15. The axillary and the deep cervical glands communicate with each other by means of the subclavian lymph nodes.

PHYSIOLOGY.

1. The formation of thrombin is necessary; this then reacts with the fibrinogen of the plasma and forms fibrin.

2. *Exercise* causes a decrease in the alkalinity of the blood; due, probably, to excessive production of sarcolactic acid in the muscles.

Digestion first causes an increase in the alkalinity of the blood, due to the secretion of hydrochloric acid; later, when the acid is absorbed, the alkalinity is diminished.

3. The normal amount of blood is said to be (roughly) about 1/13 of the body weight; so a man weighing 160 pounds should have about 12 to 13 pounds of blood.

Regeneration of blood after a hemorrhage: "If the bleeding does not go on to death the blood is restored by absorption from the tissues or from the food taken in; the first to be absorbed being the serum sanguinis, with the dissolved salts, and then the albumin. A longer time is required to form new red blood corpuscles. The regenerated blood is at first abnormally watery and poor in cells. As a result of the greater flow of lymph into the blood the number of the white blood corpuscles is greatly increased, and then their amount falls off; the red blood corpuscles again attain their usual number, and the composition of the blood gradually returns to the normal. We do not as yet know certainly how the restoration of the red blood corpuscles takes place. The most generally accepted view is that colorless corpuscles are being constantly formed in the lymph glands, in the spleen, the bone marrow, and in the liver, and a certain number of these colorless corpuscles change into the red disks."—(Tillmanns' *Surgery.*)

4. *Absorption* is the process by which the products of digestion are taken up by the circulatory system. The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unite to form the portal vein, and (2) by the lymph vessels of the small intestine, which converge to empty into the thoracic duct. The water, inorganic salts, proteids, and sugar go by way of the portal vein to the ascending vena cava; the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

The *process by which it is accomplished* is partly physical (osmosis and filtration), and is also due in part to selective action.

5. To be absorbed by the blood-vessels or lacteals the substances must be in a fluid state, and the more dilute the solution the more rapid the absorption. The absorbed matter must be rapidly removed and fresh blood supplied to the capillaries. Obstructed portal circulation delays absorption.

6. There are two theories as to the formation of lymph: (1) That it is formed from the blood plasma by the process of filtration, diffusion, and osmosis. (2) That, in addition to these, the endothelial cells of the capillaries exercise some influence.

Functions of lymph: To convey nutriment to tissues and cells of the body, and to gather up the waste material for elimination by the skin, lungs, and kidneys.

Lymph coagulates in the same manner as blood, but more slowly and feebly, owing to the less quantity of fibrinogen present in lymph. This property of coagulation is only found in the lymph in the vessels near the thoracic duct.

7. From the *ectoderm* are derived: The skin and its appendages (hair, nails), and glands (including the mammary glands); the nervous system (brain, spinal cord, ganglia, and nerves); the epithelial parts of the organs of special sense.

From the *mesoderm* are derived: The skeleton; connective tissues; muscles and bones; heart, blood-vessels, lymphatics, and spleen; the urinary and generative organs.

From the *entoderm* are derived: The epithelial lining of the alimentary canal and its glands; the epithelial lining of the respiratory tract, Eustachian tube, thyroid, and thymus.

8. The *Wolffian bodies* are the primitive sexual gland in the embryo; they later become the testicle in the male or the ovary in the female.

9. The corpus luteum is a scar on the surface of the ovary, where a vesicle has ruptured. It does not necessarily indicate pregnancy, though formerly it was supposed to be of some value in recognizing the former existence of this condition.

10. The special centers contained in the medulla are those for the following functions or actions: Respiration, salivary secretion, mastication, sucking, deglutition, speech production, facial expression; it also contains the cardiac and vasomotor centers.

11. *The function of the dura* is protection. It forms the internal periosteum of the skull, it forms three partitions for the support of the parts of the brain, it forms sinuses or venous channels for the return of the blood from the brain, and it forms sheaths for the nerves as they leave the

skull. Of the *arachnoid,* lymph supply; of the *pia,* blood supply and nutrition.

12. The *function* of the *gray* matter in the encephalon is to receive and send out nervous impulses; the *white* matter conveys these impulses.

13. Muscles, secreting glands (and liver), digestive tract during digestion, and brain.

14. *Temperature of different parts of the body:* "The temperature of the skin at the middle of the upper arm is 35.4° C., while in the sole of the foot it is but 32.26° C. In the axilla it is about 37.1° C., although some observers have placed it as low as 36.25° C. and others as high as 37.5° C.; under the tongue, about 37.5° C.; and in the rectum about 38° C. The temperature of the liver, about 41.39° C. in the sheep, is regarded as the highest in the body, and higher here during digestion than in the intervals. The mean temperature of the blood may be stated as 39° C. The temperature of the muscles is increased in contraction 1° C. Mental exertion also increases the production of heat. After such exertion the temperature of the body has been found to be 0.3° C. higher than before."—(Raymond's *Physiology.*)

15. A man cannot live in health on an exclusive meat diet. A suitable diet requires carbohydrates and fat as well as protein material; meat has but little fat and practically no carbohydrate.

MATERIA MEDICA AND THERAPEUTICS.

1. *Emetics:* Ipecac, dose 15 grains; apomorphine hydrochloride, dose 1/10 grain; tartar emetic, dose ½ grain; zinc sulphate, dose 15 grains; copper sulphate, dose 4 grains; mustard and water, alum and water, yellow mercuric subsulphate, dose 2 to 4 grains.

2. THREE MINERAL ACIDS. Sulphuric acid, nitric acid, and hydrochloric acid. "They are all useful in fevers, if well diluted, hydrochloric being usually preferred, especially in typhoid. In atomic dyspepsia, acidity of the stomach, and locally in ulcerations of the throat, hydrochloric acid is best used. Nitric is the acid generally preferred as a caustic, its action being effectual and superficial. As such it is applied undiluted to phagedenic ulcers and sloughs, warty growths, and to the cavity of the womb in chronic inflammation thereof. Dilute nitric acid is used internally in oxaluria and lithemia, intermittent and remittent fevers, and aphonia of singers. Dilute nitrohydrochloric is more suitable in chronic hepatic disorders due to malaria; sulphuric in hemorrhages, diarrheas, colliquative sweating, and as a prophylactic against lead-poisoning. Dilute sulphuric acid is used as an acid drink in fevers and before meals in acidity of the stomach. It

is very doubtful whether the latter has any special influence on the nerves or osseous systems." (Potter's *Materia Medica*, etc.)

3. SALOL. *Uses:* As a disinfectant, in inflammation of the mouth and pharynx, in cystitis, as an intestinal antiseptic in typhoid fever, in muscular rheumatism, in intestinal indigestion and fermentation, in cholera. *Dose:* gr. vijss.

GUAIACOL. *Uses:* In pulmonary tuberculosis, typhoid, diabetes mellitus. *Dose:* ℥viij.

HEROIN. *Uses:* In dyspnea, cough, whooping cough, asthma, and neuralgic affections. *Dose:* gr. 1/20 to 1/12.

4. OPIUM. *Source:* Papaver somniferum. *Physiological action:* It is analgesic, hypnotic, diaphoretic, narcotic, a respiratory and cardiac stimulant (later a depressant), it checks most secretions (not perspiration), it stimulates the brain, and contracts the pupil. *Four preparations and doses:* Extract of opium, gr. ½; tincture of opium, ℥viij; camphorated tincture of opium, ℥ij; wine of opium, ℥viij.

5. *Alteratives* are remedies which alter the course of morbid conditions; their method of action is not known; it has been suggested that they promote metabolism.

Five examples: Arsenic, colchicum, phosphorus, guaiacum, and cod liver oil.

ARSENIC. *Physiological action:* Escharotic; irritant, tonic; increases cardiac action, respiratory power, intestinal secretions, and peristalsis; produces edema, itching, diarrhea, epigastric pain, irritable and feeble heart. *Therapeutic uses:* In stomach disorders, bronchial and pulmonary affections, diabetes, diarrhea, anemia, and chlorosis, chorea, malaria, and chronic skin diseases.

COLCHICUM. *Physiological action:* It causes salivation, irritation of the gastrointestinal tract, increased elimination of uric acid, and collapse; it is also a diuretic. *Therapeutic uses:* Chiefly for gout; also in neuralgia, headache, dyspepsia, and bronchitis in gouty people.

PHOSPHORUS acts locally as an irritant; internally it is a stimulant to the nervous system and also to the bone-forming cells, a tonic, a repairer of waste, a circulatory stimulant, and an aid to the formation of red blood corpuscles. It is partly oxidized into phosphorus acid or phosphoric acid by the oxygen in the red corpuscles. In large doses it increases the urea and other nitrogenous products, raises the body temperature, diminishes the glycogen of the liver, and may cause fatty degeneration.

GUAIACUM is a diaphoretic, expectorant, laxative, and gastrointestinal irritant. It is used for sore throats, tonsillitis, rheumatism, and constipation.

COD LIVER OIL is a demulcent and emollient, it is a tissue food. It is used in tuberculosis, rheumatism, strumous

diseases, rickets, nervous diseases, and wasting diseases of childhood.

6. ACONITE. *Official preparation, with adult dose:* Fluid extract, ♏j; tincture, ♏x. *Medicinal uses:* For fevers, some inflammatory conditions, in high arterial tension, in nervous palpitation of the heart, and congestive dysmenorrhea; also externally for neuralgia, pruritis, herpes, chilblains, etc. *Therapeutic effects:* First stimulates and then paralyzes heart and also sensory nerves; lowers blood pressure; dilates peripheral blood-vessels; is a respiratory sedative; reduces body temperature; is a diuretic and diaphoretic.

DIGITALIS. *Physiological action:* It is a gastrointestinal irritant, it slows the rate of the heart, prolongs diastole, increases the force of the heart, it contracts the blood-vessels, and causes a rise in blood pressure; it also acts as a diuretic. *Therapeutic use:* Digitalis is indicated in diseases of the heart: (1) when the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in nonvalvular cardiac affections; (4) in irritable heart, due to nerve exhaustion. Digitalis is contraindicated in diseases of the heart; (1) in aortic lesions when uncombined with mitral lesions; (2) when the heart action is strong, and arterial tension high. Digitalis is also a diuretic; and it is also used in some forms of nephritis, exophthalmic goiter, pneumonia, chronic bronchitis, etc. *Dose:* Fluidextract, ♏j; extract, gr. 1/5; infusion, ʒij; tincture, ♏xv.

7. PTOMAINE POISONING. *Symptoms:* Chilliness, headache, vertigo, muscular twitchings, hallucinations, imperfect vision, weak and rapid pulse, nausea, vomiting, diarrhea, cyanosis, early dyspnea, often subnormal temperature, and occasionally cutaneous eruptions. The prognosis is guardedly favorable.

Treatment consists in the use of emetics and cathartics, or lavage and rectal irrigation. Morphine may be indicated for the relief of pain, and collapse is to be combatted by atropine, strychnine, nitroglycerin, external heat, whiskey, etc. After thorough purging, salol, naphthol, or bismuth may be given.

8. *Strychnine* is a vasoconstrictor, causes a rise of blood-pressure, and is a cardiac stimulant.

Nitroglycerin dilates the blood-vessels, causes flushing and rapid heart action, followed by fall of blood-pressure.

Strophanthus acts on the heart like digitalis (see QUESTION 6), but more promptly.

9. *Three vegetable astringents:* Gambir, dose gr. xv; tannic acid, dose gr. vij; nut-gall, dose of tincture ʒj.

Three mineral astringents: Alum, dose gr. vij; copper sulphate, dose gr. 1/5; zinc sulphate, dose gr. j.

10. *Chloroform* is not to be used in cases of fatty heart or dilatation of the heart, in those with a known idiosyncrasy, nor in the so-called lymphatic persons with overgrowth of lymphoid tissues, as, for example, adenoids. In the latter case it is particularly apt to cause sudden death. In valvular disease of the heart chloroform may be used with caution, although ether is preferable. Given a case of valvular disease that must be subjected to operation, the chances are bettered with an anesthetic than without it, as the pain and mental shock are worse for the heart than is the anesthetic. Chloroform should be given drop by drop, upon several layers of gauze, just as the patient inspires; and the chloroform vapor should never exceed 4 per cent. of the air inspired.

11. *Uremic poisoning.* These symptoms are especially referable to the nervous system, and include such premonitory signs as headache, vertigo, nausea, indistinct vision, drowsiness, constipation, scanty urine, which may contain albumin, etc. The uremic seizure may manifest itself by marked gastrointestinal disturbances, convulsions, or coma with more or less rise of temperature, nocturnal dyspnea, Cheyne-Stokes breathing, vomiting, diarrhea, dry skin, scanty albuminous urine with casts, etc. *The treatment* should be directed toward elimination of the poisons. Croton oil (gtt. 1) and olive oil (3i) should be administered at once, and later elaterium (gr. 1/8), calomel (gr. 2), and compound jalap powder (gr. 20) should be prescribed. A hot bath (110° F.) or a hot vapor bath should be given to produce free diuresis. Chloral (3i), nitrite of amyl, or chloroform may be needed to control the convulsions. The diet should be liquid, and the condition of the pulse will govern the use of sedatives or stimulants.—(Gould and Pyle's *Pocket Cyclopedia.*)

12. *Phenacetin* is an antipyretic and analgesic, it is a cardiac depressant, and has also been used in epilepsy. Dose, 7 grains.

13.

℞. Ammonii chloridi 3j
Ammonii carbonatis 3j
Ammonii bromidi 3j
Fluidextracti glycyrrhizæ 3iv.
Aquæ distillatæ q. s. ad ℥vj. M.

Sig. A dessertspoonful every four hours.

The ammonium chloride stimulates the air passages; the ammonium carbonate stimulates the heart and respiration; the ammonium bromide allays the cough; the licorice hides the salty taste of the ammonium salts.

14. The official preparations of arsenic, with their doses, are: Arseni trioxidum, gr. 1/30; Liquor acidi arsenosi, ♏vij; Arseni iodidum, gr. 1/20; Sodii arsenas, gr. 1/6;

Sodii arsenas exsiccatus, gr. 1/20; Liquor potassii arsenitis, ℥vij; Liquor sodii arsenatis, ℥v; Liquor arseni et hydrargyri iodidi, ℥vij.

15. THREE ANIMAL EXTRACTS:—(1) *Thyroid extract,* used in myxedema, goiter, sporadic cretinism, and arteriosclerosis. (2) *Suprarenal extract,* used in asthma, hay fever, Addison's disease, shock, as a local vasoconstrictor in minor surgery. (3) *Pituitary extract,* used in acromegaly.

CHEMISTRY.

1. (*a*) *Uric acid:* "In man uric acid has a twofold origin; one portion, coming from the breaking down of the nuclein-containing tissues or cell elements of the man's own body, and hence is of endogenous origin, while the other portion—usually the larger—is of exogenous origin, coming from the transformation of free and combined purin compounds present in the food." (Chittenden.)

(*b*) Gout stones are principally composed of: Sodium biurate, and potassium biurate; uric acid, sodium, potassium, calcium, and magnesium.

(*c*) Uric acid is insoluble in alcohol and ether; is slightly soluble in water; is soluble in sulphuric acid and hydrochloric acid.

2. (*a*) The tartrates exist in the juice of the grape, and are also obtained as a by-product in the manufacture of wine.

(*b*) *Cream of tartar:* $KHC_4H_4O_6$

(*c*) *Rochelle salt:* $KNaC_4H_4O_6$

3. (*a*) *Chemically,* fats are compounds of fatty acids with glycerin; they may be termed glycerides or glyceric ethers.

(*b*) The fats ingested finally exist in the small intestine as soaps and glycerin salts. These substances are absorbed by the columnar epithelial cells; they eventually pass into the lacteals, where they form an emulsion with the lymph and pass into the thoracic duct, and then into the blood. The fat droplets are then carried all over the body and are finally deposited in fatty cells in the adipose tissue.

"The *offices which fat subserves in the human body* are manifold: (1) It protects the underlying parts from injury as in the palm of the hand and the sole of the foot; (2) it serves as a lubricator, as in the sebaceous matter poured out upon the skin, which keeps it soft and pliable; (3) it acts as a nonconductor of heat, aiding in the retention within the body of the vital heat which would otherwise be lost so rapidly as to produce injurious results; (4) it serves as a reservoir when the supply of food is cut off or diminished; thus in wasting diseases the fat deposited in various parts of the body is absorbed, and contributes

to its nutrition; (5) it is a source of energy and of heat through its oxidation, the final products of which are CO_2 and H_2O."—(Raymond's *Physiology.*)

(*c*) *Fat occurs in the urine,* in: Chyluria, pyonephrosis, fatty degeneration of kidney, chronic white kidney, acute phosphorus poisoning.

4. (*a*) Nitroglycerin is trinitroglycerol or glycerol trinitrate, $C_3H_5(NO_3)_3$.

(*b*) In medicine a 1 per cent. alcoholic solution is used, in doses of one minim. For effect on the vascular system, see MATERIA MEDICA, QUESTION 8.

5. (*a*) Chloral hydrate is trichloraldehyde and water; it has the constitution $C.Cl_3.CH(OH)_2$.

(*b*) Chloral acts as a poison by its direct action on the nerve centers; first in the gray matter of the center, then on the spinal cord, and medulla, and on the heart.

6. In the *ferrous* salts, the atom of iron is bivalent; in the *ferric* salts, the atom of iron is quadrivalent, and two of these atoms are united, thus forming a hexavalent group.

Ferrous oxide, FeO; Ferric oxide, Fe_2O_3; Ferrous chloride, $FeCl_2$; Ferric chloride, Fe_2Cl_6.

7. Potassium permanganate is a dark prismatic solid obtained by fusing a mixture of manganese dioxide, potassium hydroxide, and potassium chlorate. It has the formula $K_2Mn_2O_8$. It is a good oxidizing agent (each molecule having eight atoms of oxygen), and in this way acts as a disinfectant.

8. Mercurous iodide, Hg_2I_2; and mercuric iodide, HgI_2. The "ous" compounds of mercury make with KHO a black precipitate; the "ic" compounds of mercury make with KHO a yellow precipitate. In the case of the chlorides and iodides the "ic" compounds of mercury are more poisonous than the "ous" compounds.

9. (*a*) A water is said to be "hard" when it forms a curdy deposit with soap. (*b*) An abnormal quantity of chlorides denotes organic contamination, generally sewage.

10. *Three urinary pigments:* Urochrome, urobilin, and uroerythrin.

11. (*a*) *Three univalent elements:* Hydrogen, chlorine, and silver.

(*b*) HNO_3 is a monobasic acid, and its radical is NO_3.
H_2SO_4 is a dibasic acid, and its radical is SO_3.
H_3PO_4 is a tribasic acid, and its radical is PO.

12. (*a*) BROMIN. *Source:* Sea water and sea weeds. *Symbol:* Br. *Valency:* One. *Atomic weight:* 80.

(*b*) *Acidum hydrobromicum dilutum (U.S.P.)* is a liquid composed of 10 per cent. by weight of absolute hydrobromic acid, HBr, and about 90 per cent. of water.

13. (*a*) Oxalic acid is a dicarboxylic acid, with the formula COOH·COOH.

(*b*) It is liable to be mistaken for Epsom salt (magnesium sulphate).

(*c*) *Treatment for poisoning:* Magnesia or slaked lime suspended in a small quantity of water or mucilaginous liquid should be given as soon as possible. If vomiting does not occur and the symptoms of corrosion are not marked give an emetic. Do not use the stomach pump or tube.

14. (*a*) *Principal constituents of cow's milk:* Water, casein, albumin, fat, sugar (lactose), and salts.

(*b*) When milk is allowed to stand part of its lactose is changed into lactic acid; thus $C_{12}H_{22}O_{11} + H_2O = 4C_3H_6O_3$. This is due to the action of microorganisms. This lactic acid precipitates some of the caseinogen. The process is called *souring*.

The chief protein in milk is caseinogen; this, when acted upon by rennet, forms casein; the *curd* is casein and entangled fat.

15. ALKALOIDS. Of *belladonna*, atropine; of *aconite*, aconitine; of *nux vomica*, strychnine and brucine; of *opium*, morphine, codeine, thebaine, narcotine, narceine, papaverine.

HISTOLOGY.

1. Human blood is composed of a liquid portion, the plasma, and solid bodies, the corpuscles. These latter are red corpuscles, white corpuscles, and platelets.

2. *Different leucocytes:* (1) Small mononuclear (having only one nucleus); (2) large mononuclear (having only one nucleus); (3) transitional (intermediate between mononuclear and polymorphonuclear); (4) polynuclear or polymorphonuclear (having more than one nucleus, or with various shaped nuclei); (5) eosinophile (readily taking the eosin stain).

3. Thrombocytes are blood platelets.

4. The mucous membrane of the stomach contains a fine layer of muscular tissue, the *muscularis mucosæ*, internal to which are the tubular glands. The epithelium of the surface consists of a layer of columnar cells extending into the mouths or ducts of the gastric glands. The gastric glands are parallel to one another and closely crowded together with their blind extremities towards the muscularis mucosæ, and opening on the surface of the mucous membrane. Their length varies from 1/20 to 1/60 inch, and they are 1/100 to 1/300 inch in breadth. Two different kinds of glands are distinguished. The glands at the cardiac end are simple tubules with short ducts and lined by granular cubical cells. Besides these cubical cells there

are also some large cells called the oxyntic or parietal cells. At the pyloric end of the stomach, the tubules are branched, lined by cubical cells, and the ducts are larger than those at the cardiac end.—(Ashby's *Physiology.*)

5. The *larynx* is lined with stratified squamous and stratified ciliated epithelium; the *trachea,* with stratified ciliated; the *bronchi,* with stratified ciliated; and the *bronchioles,* with simple ciliated, simple columnar, and simple squamous cells.

PATHOLOGY.

6. The white blood cells, in inflammation, get to the outer zone of the blood stream; then by emigration, they pass through the wall of the vessel into the surrounding tissues where they aid in repairing the tissues, and also assume a protective character by their phagocytic action. If the bacteria are too many or too violent, the leucocytes get killed, and by the digestive action of the toxins of the bacteria pus is formed.

7. *Hemolysis* is destruction of the red blood corpuscles (by a specific antiserum or by poisons).

8. *Agglutination* is the loss of motility and the clumping in small masses of the microorganisms in a culture on the addition of a specific immune serum. It is supposed to be due to the development of agglutinins.

9. *Atelectasis* is the condition of the lung when it has never been properly expanded by air; or when the lung is compressed or collapsed. *Causes:* Congenital, pleural effusions, tumors, aneurysms, empyema, hydrothorax. *Results:* Bronchopneumonia; carnification and splenization of the lung.

10. Gall stones, tumors, inflammation, etc., connected with liver and bile ducts, obstructed bile duct, will prevent flow of bile into intestines. The result will be jaundice, pruritus, slow pulse and respiration, headache, vertigo, irritability, restlessness, insomnia.

BACTERIOLOGY.

11. *Chemical composition of bacteria:* Water (about 80 to 88 per cent.); phosphoric acid, sulphur, potassium, chlorine, calcium, magnesium, iron, and silica; hemicellulose is often present; nuclein, hypoxanthin, guanin, and adenin are often present.—(From Jordan's *Bacteriology.*)

12. *Proteid bodies* are organic nitrogenous compounds containing carbon, oxygen, hydrogen, nitrogen, sulphur, and sometimes iron, of very complex constitution and whose molecule is undetermined.

Varieties: (1) *True or native albumins* (albumins proper, globulins, coagulating albumins, nucleoalbumins, histones, protamines).

(2) *Derived albumins or transformation products* (coag-

ulated or modified albumins, acid and alkali albumins, albuminates, albumoses, peptones).

(3) *Proteids* (nucleoproteids, hemoglobins, glucoproteids, lecithoproteids).

(4) *Albumoids* (collogen, keratin, elastin, amyloid, spongin).

13. Most bacteria require proper temperature, generally at or near that of the body; oxygen is generally needed, those that cannot live without it being called aërobic and those that can grow without it anaërobic; nutriment of a proper kind, containing both organic and inorganic material (chiefly decomposable organic matter); a slight degree of moisture; a medium of slightly alkaline reaction; and rest. Individual bacteria may require modifications of the above essentials.

14. Besides diseases, bacteria may produce heat, light, colors, putrefaction, decay, fermentation, ptomaines, toxins, nitrites, odors, gases, acids, alkalies, and may liquefy gelatin.

15. The *fermentations of milk* are: Lactic, butyric, alcoholic. Of these the butyric is harmful, the others innocuous.

Pasteurising milk kills the pathogenic germs and does not impair the nutritive qualities of the milk.

Boiling milk kills both the germs and their spores, and also impairs the digestibility of the milk.

PRACTICE OF MEDICINE.

1. *Bubonic plague* is an acute febrile infectious disease, characterized by a tendency to buboes or suppurating lymphatic glands and carbuncular swellings in various parts of the body, marked cerebral and vascular disturbances, and intense prostration. It is due to the bacillus pestis, and is supposed to be carried by the flea on the rat. It is marked by rapid onset and course. In human beings the death rate in about 80 per cent. The treatment is largely preventive; there are no satisfactory curative procedures; much, however, is hoped for from an antitoxic serum.

2. In *tonic spasms* the muscular contractions are continuous; in *clonic spasms* contractions and relaxations rapidly alternate.

3. SYPHILIS. *The primary stage* is characterized by the hard chancre, which appears on the prepuce or glans penis near the corona, or on the frænum. In the female it appears on the inner side of the labia majora or nymphæ. Bullety lymphatic glands in the groin, with hardened lymphatics running from the sore, are characteristic. The typical chancre is a sore with a very indurated base, which may feel as hard as a button. A urethral chancre just inside the meatus may occur.

Secondary stage affects chiefly the skin and mucous membranes. The characteristics of the skin eruption are: Polymorphism, rough symmetry, absence of itching or pain, copper or raw-ham color. Mucous patches are shallow ulcers on fauces, tonsils, palate, tongue, inner side of cheek and lips.

Third stage is gumma. The tissues are infiltrated. The gumma may ulcerate; when it does the edges are sharply cut, outline is rounded, and base is sloughy.

4. In *renal* hematuria the blood and urine are intimately mixed, tube casts are apt to be present, and there may be renal colic or pain in the lumbar region. In *cystic* hematuria the blood and urine are not so well mixed, and pure blood is apt to be passed at the end of urination.

5. CHOLELITHIANS. *Causes:* Changes in the bile in the gall bladder, stasis of bile, sedentary habits, acid fermentation of the bile, inflammation of the biliary tract, and microorganisms (typhoid or colon bacilli). *Symptoms:* Indigestion, gallstone colic, sometimes jaundice and fever. Gallstone colic is of very sudden onset, and there are: Agonizing pain, vomiting, collapse, profuse perspiration, rapid and feeble pulse, and pale face.

6. EDEMA GLOTTIDIS. *Causes:* Scalds, swallowing of corrosives, severe laryngitis, retropharyngeal abscess, submaxillary cellulitis, foreign bodies. *Symptoms:* Dyspnea, swollen and edematous mucous membrane.

7. ***Four physical signs of consolidation of lung tissue:*** (1) Increased vocal fremitus; (2) dullness on percussion; (3) bronchial respiration with prolonged expiration; and (4) increased vocal resonance.

8. High blood pressure would be determined by the use of a sphygmomanometer. High blood pressure is found in: Chronic interstitial nephritis, arteriosclerosis, nervous excitement, uremia, myocarditis, lead poisoning, gout, cerebral hemorrhage, and sometimes in acute nephritis.

9. *For a fourteen-months-old bottle-fed baby:* "Five feedings in twenty-four hours are required, the interval between feedings being about four hours. The daily amount of food needed is from 40 to 50 ounces. Each feeding, therefore, should consist of from 8 to 10 ounces, of which four-fifths is milk and one-fifth some form of farinaceous food, thoroughly cooked, and then strained. . . . In preparing the food the milk and the gruel are simply mixed together while the latter is warm, and salt and a small quantity of cane sugar added to make it palatable."—(Holt.)

10. *Ataxia* may be defined as lack of coordination in muscular movements, so that the performance of certain acts becomes difficult or impossible. The lesion may be in the

cortex of the cerebrum, pons, crura, corpora quadrigemina, cerebellum, or spinal cord.

Aphasia is the inability to express ideas by either speech or writing. It is caused by lesions of the cortical centers, and is not due to lesions of the peripheral nerves or of the organs concerned in speech or writing. The center for speech is in the third left frontal convolution.

11. *Bronchial breathing* is that which is heard normally over the trachea, larynx, or large bronchi. It is characterized by an entire absence of all vesicular quality; inspiration is high pitched and tubular; and expiration is longer, higher, and of greater intensity; there is an interval between the two sounds.

When heard elsewhere *bronchial breathing* may indicate consolidation of the lung, or a large cavity communicating with a bronchus; it is heard in phthisis, lobar pneumonia, and hemorrhagic infarction; it is also heard normally over the trachea and large bronchi.

12. *Waxy casts* occur especially in chronic parenchymatous nephritis. *Epithelial casts* occur especially in acute parenchymatous nephritis. *Granular casts* are especially common in chronic nephritis, but may occur in acute nephritis. *Fatty casts* occur chiefly in chronic parenchymatous nephritis.—(From Stevens' *Practice.*)

13. *Scarlet fever,* period of incubation about four days, sudden onset, prodromal symptoms being generally absent; slight malaise may be noticed, and there may be an initial chill. *Measles,* period of incubation about ten or twelve days; chilliness, moderate fever, coryza, mild conjunctivitis, headache and photophobia mark the onset. *Smallpox,* period of incubation about twelve days; onset is abrupt, and beyond malaise, there may be no prodromal symptoms.

14. (1) Urine may have *specific gravity under 1010* in: Diabetes insipidus, chronic interstitial nephritis, and hysteria.

(2) *Above 1030* in: Diabetes mellitus, fevers, diarrhea.

15. *Vesicles* are circumscribed elevated areas of the skin containing clear or opaque fluid, varying in size from a pinhead to a pea. *Example:* Herpes zoster.

Papules are circumscribed solid areas of elevation of the skin varying in size from a pinhead to a pea. *Example:* Comedo.

Pustules are circumscribed elevations of the skin containing pus and varying in size from a pinhead to a fingernail. *Example:* Furunculosis.

OBSTETRICS AND GYNECOLOGY.

1. The chief differences between the male and female pelvis are thus tabulated in Morris's *Anatomy:*

MALE.	FEMALE.
Bones heavier and rougher.	Bones more slender.
Ilia less vertical.	Ilia more vertical.
Iliac fossæ deeper.	Iliac fossæ shallower.
False pelvis relatively wider.	False pelvis relatively narrower.
True pelvis deeper.	True pelvis shallower.
True pelvis narrower.	True pelvis wider.
Inlet more heart-shaped.	Inlet more oval.
Symphysis deeper.	Symphysis shallower.
Tuberosities of ischia inflexed.	Tuberosities of ischia everted.
Pubic arch narrower and more pointed.	Pubic arch wider and more rounded.
Margins of ischiopubic rami more everted.	Margins of ischiopubic rami less everted.
Obturator foramen oval.	Obturator foramen triangular.
Sacrum narrower and more curved.	Sacrum wider and less curved.
Capacity of true pelvis less.	Capacity of true pelvis greater.

2. In the *virgin:* The fourchet is present, the perineum is tense and deep, the labia are in apposition, and the hymen may be present.

In the *multipara:* The fourchet is missing, the perineum is relaxed and probably torn, the vulva is frequently patulous, there is no hymen, and there may be carunculæ myrtiformes.

3. *Fecundation* is the result of the meeting of a live and healthy spermatozoon with a live and healthy ovum, in a suitable medium (generally the Fallopian tube). During coitus the seminal fluid is ejected into the upper part of the vagina and against the cervix of the uterus; the spermatazoa enter the uterine cavity (either by the suction of the uterus or by their own vibratile motion) and so on to the Fallopian tube. The uterus enlarges in every way; it first descends into the pelvis, and then ascends, till the last two weeks; the cervix gets shorter and softer.

4. *Pelvimetry.* "The process of determining the size of the pelvis. The transverse diameters of the pelvic inlet are obtained by measuring between the anterior superior spinous processes of the iliums (26 cm.); between the widest divergence of the crests of the iliums (29 cm.), and between the two femoral trochanters (31 cm.).. The anteroposterior or conjugate diameter is obtained by measuring between the depression under the last lumbar vertebra and the upper edge of the symphysis (20¼ cm.). This

is called the external conjugate diameter. A more reliable measurement is the internal conjugate diagonal. This is the measurement between the promontory of the sacrum and the middle of the subpubic ligament. It is obtained by passing the index and middle fingers of the left hand into the vagina in such a manner that the tip of the middle finger rests upon the top of the promontory of the sacrum. A mark is made on the upper surface of the hand, just where it presses against the under surface of the symphysis. The distance between this mark and the tip of the middle finger is the internal conjugate diagonal (12¾ cm.). The true conjugate is obtained from this diameter by simply subtracting 1½ cm."—(Gould and Pyle's *Pocket Cyclopedia.*)

5. *Walcher's position:* The patient being in the dorsal position, is brought to the edge of a bed or table of sufficient height that her thighs are allowed to hang down so that the toes just touch the floor, or her feet may be supported on the lower rung of a chair. The buttocks must be slightly over the edge of the bed. The result of this position is to tilt the pelvis downward and backward, at the same time stretching the pubic joint. The result of this is to slightly enlarge the pelvic brim.

6. It should be constantly examined, to see (1) that she is excreting enough solids (urea, etc); (2) that she is not suffering from albuminuria.

7.

PLACENTA PRÆVIA.	ACCIDENTAL HEMORRHAGE.
Most commonly manifests itself after the sixth month of gestation, but may occur as early as the second month.	Most commonly occurs during the first stage of labor, but may occur at any time during the last three months of pregnancy.
The hemorrhage is abrupt, but painless.	The hemorrhage is sudden, and generally is attended with sharp pain.
There are generally repeated hemorrhages of increasing severity.	Hemorrhage persists until the uterine contents are evacuated or the patient perishes.
There is an edematous condition of the cervix and lower uterine segment, with marked pulsation.	Vaginal examination reveals no deviation from the condition normal to pregnancy.
Cervix is generally quite patulous, and within may be detected the placenta.	The cervix is perhaps (if labor be initiated) slightly patulous.
The placental bruit is situated low down.	The placental bruit is in normal position.

—(Dorland's *Obstetrics.*)

The above two occur *before labor;* postpartum hemorrhage occurs *after* labor.

8. "In the presence of actual hemorrhage the treatment varies according as the placenta is still within the uterus or has already been expelled. In the former case the uterus should at once be grasped through the abdominal wall and firmly kneaded. If firm contractions come on, all is well, but if the hemorrhage continues and the uterus relaxes as soon as the kneading is stopped, the placenta should be expressed by Credé's method; and if this cannot be accomplished and the patient's condition is alarming, manual removal may become necessary. . . . If the hemorrhage does not cease after the delivery of the placenta, the cause should be ascertained and suitable treatment instituted. Tears should be located and their edges brought together by sutures. On the other hand, if the hemorrhage is the result of the retention of placental tissue, the carefully disinfected hand should be carried up into the uterus in order to seek for and remove the retained cotyledon. Under such circumstances the hand acts as a most efficient irritator, causing the uterus to contract energetically. After separating the retained portion of the placenta the hand should not be withdrawn at once, but should be allowed to recede gradually as it is forced down by the contraction of the fundus. If the hemorrhage is due to atony, the uterus should be vigorously kneaded, and from forty to sixty minims of ergot or of ergotol administered hypodermically. . . . . If these measures are not attended with the desired result, a very hot intrauterine douche of several liters of sterile salt solution should be employed. . . . If the hemorrhage persists in spite of the douche, our only hope of controlling it is by packing the uterus tightly with sterile gauze. Before resorting to the use of the pack it is always advisable to palpate the interior of the uterus, as occasionally a portion of the placenta may have been retained, even though immediately after expulsion the organ may have apparently been entire."—(Williams' *Obstetrics.*)

9. Remove mucus, etc., from infant's mouth and throat, slap it on buttocks, throw cold water on its chest, and dip its body at the same time into warm water, and try artificial respiration. Electricity has been tried.

10. OPHTHALMIA NEONATORUM. *Causes:* The gonococcus or some other pyogenic microorganism; the secretions of the mother contain the infecting agent, and transmission may occur directly during parturition, or indirectly by the fingers of physician or nurse, cloths, instruments, etc. *Symptoms:* Swollen eyelids, with copious purulent discharge; ulceration of the cornea may ensue. *Prophylaxis:* Whenever there is the possibility of infection, or in every

case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth. *Treatment:* Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burnt.

11. Puerperal infection is caused by bacteria. It may be prevented by the most painstaking asepis on the part of physician, nurse, and patient.

12. Clip pubic hair and then shave with safety razor. The abdomen, from the ensiform to symphysis and from flank to flank and one-third the way down the thighs, must be scrubbed with soft-bristle brush, tincture of green soap, and hot water thoroughly (for ten minutes by the watch, with four changes of sterile water), paying special attention to navel and the pubic regions. Scrub thoroughly with alcohol with the second sterile soft-bristle brush. Cover the abdomen with the sterile gauze pad and put on the binder. The above is done the afternoon before the operation. On the morning of the operation give an enema. Same cleansing of abdomen again, but use lysol before the alcohol. Catheterize the patient, wash out vagina with tincture of green soap and then give vaginal douche.—(From Hirst.)

13. PELVIC ABSCESS. *Etiology:* Pelvic cellulitis, rupture of tube (in ectopic gestation or pyosalpinx), pus from neighboring tissues, gonorrhea. *Treatment:* The abscess should be opened and drainage instituted, generally through the vagina.

14. The *menopause* is the period when menstruation ceases. The symptoms of the menopause are referable to two stages: a stage of menstrual irregularity preceding the cessation of the menses, and a post-cessation stage of variable systemic disturbances. In normal or nearly normal cases the irregularities are not excessive; the systemic disturbances are slight. There is a period of unstable equilibrium. The woman may at times be unusually capricious and emotional; yet she passes through this physiological crisis with only a few minor disturbances. She may have the characteristic vasomotor flushes, perspiration, vertigo, somnolence, numbness, and faintness. The menstrual function ceases as it began, and other psychic disturbances are common in the abnormal cases, and may be exaggerated. The menstrual deviations vary in wide limits. The flow may gradually decrease and come at lengthening intervals

until it altogether ceases; it may occur at short intervals or become continuous; it may become so excessive as almost to amount to dangerous hemorrhage; or life may be jeopardized by a slow, continuous drain. There is an increased tendency to malignant disease of the uterus and breasts during this period. The excessive fear of this may prey injuriously on the mind of the woman.—(From Dudley's *Gynecology.*)

15. *Vaginitis* is a condition of inflammation of the vagina. It is characterized by redness, swelling, pain, heat, irritation, and increased secretion. There may be frequent and painful urination. *Treatment* consists in rest, cleanliness, douches, the application of soothing lotions, and removal of any cause; salines and anodynes are also indicated.

Vaginismus is a condition of painful and spasmodic contraction of the vaginal orifice, which renders coitus either painful or altogether impossible. The slightest touch causes painful spasms, and examination may be impossible without an anesthetic. Its *causes* are irritable hymen, ulcer, or fissure anywhere in the immediate vicinity, urethral caruncle, carunculæ myrtiformes, a long perineum with vaginal orifice placed too anteriorly. The *treatment* consists in removing the cause when possible, tonics and general constitutional treatment, dilatation of the vaginal orifice; local application of a 5 per cent. solution of cocaine will relieve the hyperesthesia and allow coitus. The condition is sometimes incurable.

SURGERY.

1. *Symptoms of perforation in typhoid:* Severe pain and nervous chill, rapid pulse, shock, abdominal rigidity, costal breathing, vomiting. *Treatment:* Operate *at once.* Open abdomen in right iliac fossa; find every perforation and invest it with two layers of Halsted sutures; flush peritoneum with hot salt solution; leave the wound open, and drain. Elevate the patient in bed, and give rectal injection of saline solution.

2. *Empyema of frontal sinus.* "The usual cause is an injury which may long antedate the symptoms. This injury causes or leads to blocking of the infundibulum; secretion accumulates and distends the sinus; and in some cases pus forms. In many cases the fluid slowly accumulates, and it requires years to produce marked symptoms. In other cases infection takes place, and the symptoms are positive and violent. If the outlet into the nose is not permanently blocked the fluid may discharge itself from time to time. In the chronic cases there is rarely much pain. The chief sign is a swelling of the inner or upper part of the orbit, which swelling progressively increases in size and displaces the eye. If at any time acute

symptoms supervene, there will be pulsatile pain, discoloration, and tenderness. *Treatment:* In some cases it is possible to pass a trocar upward from the nose into the sinus, and so drain and irrigate. In most cases an incision should be made through the soft parts, and the sinus opened by a trephine or chisel. After the sinus has been opened it must be curetted, the opening into the meatus should be restored and enlarged, and a drainage tube is to be passed from the forehead incision into the nostril. Some surgeons open the sinus by making an osteoplastic flap."—(Da Costa's *Surgery.*)

3. *Symptoms:* Intense pain, the skin is brawny, movement and defecation are very painful, fluctuation is hard to detect. *Treatment:* Prompt and free incision radiating from the anus; every part of the abscess must be opened, and all septa broken. Irrigate, insert iodoform gauze and a drainage tube.

4. The most important thing is to render the wound aseptic by enlarging it and washing its depths and surroundings thoroughly with 1 in 20 carbolic or 1 in 500 biniodide. An anesthetic is necessary. Loose fragments should be removed, hemorrhage dealt with, and the bones fixed by wires or screws. The wound should be drained by a tube at the most dependent spot, and the rest of the wound closed. The limb should then be fixed on a splint, the foot at right angles to the leg and the heel kept off the splint by pads. The inner border of the patella, the inner malleolus and the inner border of the ball of the big toe should be in a straight line.

5. The pharynx shows a diffuse gummatous infiltration: the mucous membrane is thick and nodular, ulcerates, and interferes with breathing and swallowing. Stenosis may result.

6. Pain, symptoms of obstruction, the bowel is engorged with venous blood. The diagnosis is hardly made without opening the abdomen.

7. INCONTINENCE OF URINE. *Etiology:* Irritation of bladder, phimosis, adherent prepuce, caruncle, threadworms in rectum, fissure, overloaded rectum, stone in bladder, very acid or alkaline urine, paralysis, hip-joint disease, drinking too much fluid before bed time.

8. *Symptoms of cerebral compression:* Drowsiness leads on to coma. When coma is well marked, unconsciousness is complete, the breathing is slow, and stertor is present from paralysis of the soft palate. The breathing is of the Cheyne-Stokes character as death approaches, from paralysis of the respiratory center. The pulse is slow and full at first, rapid and irregular at the end. The pupils first contract, then dilate, and become insensitive to light. If the compression is at first one-sided, the pupil on that side goes

through these changes in advance of that of the opposite side. Motor paralysis, first on one side and then on both, soon becomes complete. If the motor area is first compressed, convulsions precede paralysis. Retention of urine and paralysis of the sphincter ani are usual.—(*Aids to Surgery.*)

9. "A stout antitoxin or exploring needle should be sterilized by boiling, and the skin in the region of the third and fourth interspaces in the lumbar spine (the spinous process of the fourth vertebra is on a line joining the iliac crests) is to be carefully sterilized as if for a major operation. The point of the needle is then inserted in the fourth interspace, either in the middle line, or a third of an inch from it; it must be pointed forwards, with a very slight inclination upwards. In most cases it will go straight into the spinal canal below the termination of the cord, and the fluid will escape. If bone is encountered, it is advisable to withdraw the needle completely and reinsert it at a slightly different angle. In cases of repeated failure the third interspace may be tried."—(Rose and Carless.)

10. *Symptoms of papilloma of bladder:* Hematuria, pain, frequency of urination, portions of the tumor may be passed, with the cystoscope the papilloma may be seen. *Treatment:* Removal by the suprapubic route, bleeding is stopped by cautery, drainage is needed for a few days.

11. *Indications for drainage:* Drainage is used in all infected wounds, in most very large wounds, in wounds to which irritant antiseptics have been applied, in cases in which large abnormal cavities exist, in very fat people, and in individuals with such thin skin that we dare not apply firm pressure. (Da Costa.)

12. *Causes of stricture of rectum:* Inflammation, dysentery, syphilis, tuberculosis, cancer, pelvic cellulitis, adhesions following operation. *Symptoms:* Constipation alternating with diarrhea, feces are flattened, pain is present, blood and mucus may be noticed.

13. *Tuberculous peritonitis: Treatment* is by hygiene and good feeding at first. If this fails, simply laparotomy often cures the ascitic variety, sometimes the fibrous, but seldom the ulcerous. It is not necessary to wash out the abdominal cavity, but only to drain away the fluid and stitch up the opening. Laparotomy may also be required to relieve intestinal obstruction, fecal fistula, or localized abscesses.

14. *Lipoma* shows a soft, rounded, lobulated mass; skin is dimpled: growth is movable; fluctuation is present.

15. *Aneurysm of femoral artery* shows a tumor in the course of the artery, increased in size when the artery is compressed below; and diminished when the artery is com-

pressed above; thrill, bruit, and expansile pulsations are present. *Treatment:* Either ligate the external iliac artery, or extirpate the sac.

HYGIENE.

1. Hygiene is the science and art of all that tends to the maintenance and improvement of health, the prevention or shortening of the duration of diseases, and the prolongation of life.

2. The person should be advised to keep himself in as good health as possible, to shun the society of hypochondriacs, to lead an active and hygienic life.

In the case of *pneumonia* the person should be advised to get all the fresh air possible, and to eat nutritious diet. *Rheumatism:* Drink plenty of water, avoid alcohol, take milk, wear flannel. *Nephritis:* Avoid alcohol, take milk, avoid too much meat, avoid exposure to cold and damp. *Insomnia:* Warmth in bed, a certain amount of fatigue, and a hot bath before going to bed.

For *insomnia:* The diet should be regulated, the evening meal should be light; exercise and laxatives may be required; the bedroom should be quiet, dark, well ventilated, and of moderate temperature; tea, coffee, and tobacco should be used sparingly, or avoided.

3. *For the maintenance of the healthy functions of the body:* Personal cleanliness, regulation of diet, avoidance of all excesses, suitable clothing, sufficient exercise in the open air, cleanly surroundings, plenty of suitable work.

4. *Antiseptic* is an agent which is destructive of micro-organisms.

Disinfection is the process of destroying germs or inhibiting their activity.

5. *Five disinfectants:* Heat, steam, bichloride of mercury, carbolic acid, formaldehyde.

6. The extreme humidity prevents evaporation (which is one of the means of loss of body heat) so the body temperature is increased.

7. PERIOD OF QUARANTINE FOR: *Diphtheria:* till the patient is free from all signs of congestion or rhinitis, and continued bacteriological examination is persistently negative. *Smallpox:* till all crusts or scabs have entirely disappeared.

8. The patient must be isolated; no one but the physician and nurse must enter the room; the physician should put on a large washable gown when he goes in, and remove it on leaving, at the same time washing his hands in a disinfectant; the nurse, when she leaves the sick room should also remove her clothes and put on others, at the same time disinfecting herself. At the termination of the disease everything should be disinfected; toys, and books, etc., are better burnt.

MEDICAL JURISPRUDENCE.

9. *Malpractice* is a failure on the part of a medical practitioner to use such skill, care, and judgment in the treatment of a patient as the law requires; and thereby the patient suffers damage. If due to negligence only, it is *civil* malpractice. But if done deliberately, or wrongfully, or if gross carelessness or neglect have been shown, or if some illegal operation (such as criminal abortion) be performed, it is *criminal malpractice.*

10. *Violent causes of death:* Wounds, burns and scalds, suffocation, strangulation, hanging, drowning, heat and cold, exposure, starvation, electricity, poisoning.

11. *Abortion is justifiable:* "(1) In pelvic deformity where there is sufficient space for a seven months' child to be delivered without injury. The object is twofold: (*a*) to save the child's life by obviating the necessity for craniotomy; (*b*) to spare the mother the dangers of craniotomy, cesarean section, symphyseotomy, or other operations that might be required if the pregnancy went to full term. (2) In cases where, in previous labors, the head of the child at full term has been prematurely ossified, or unusually large, or that labor has been difficult and dangerous, even though the pelvis were normal. The period of delivery need only be two or three weeks before 'term' in these cases. (3) In cases where the children of previous pregnancies have died *in utero* during the later weeks of gestation from disease (fatty, calcareous, or amyloid degeneration, etc.) of the placenta. (4) In conditions where the continuance of pregnancy seriously endangers the mother's life, such as: excessive vomiting; albuminuria; uremic convulsions, or paralysis; chorea; mania, organic disease of the heart, lungs, liver, blood-vessels, etc., threatening fatal disturbance of the respiration, circulation, and other disturbance of the respiration, circulation, and other vital functions; irreducible displacements of uterus; placenta prævia with hemorrhage; and in dangerous pressure upon neighboring organs from over-distention of uterus, due to dropsy of amnion, tumors, multiple pregnancy, etc."—(King's *Manual of Obstetrics.*)

12. According to Taylor, the term insanity is applied to those states of disordered mind in which a person loses the power of regulating his actions and conduct according to the ordinary rules of society. In all cases of real insanity the intellect is more or less affected.

13. In *death by drowning:* The surface is pallid, the face appears tranquil, the eyes and mouth being partly open. The skin often has the appearance known as gooseskin, and, if the body has lain upward of twelve hours in the water, that of the hands and the feet is sodden by imbibi-

tion. The most important external sign is the presence on the mouth and nostrils of a fine froth (possibly blood stained) composed of air, mucus, and the medium in which drowning took place; if the body remains three or four days in water the froth disappears. Exceptionally, fragments of weeds or other small objects may be found tightly grasped in the hands. On opening the thorax, the lungs, gray in color, with reddish staining, are seen to be very voluminous, a condition known as ballooning, partly due to infiltration of the lung tissue with some of the medium in which drowning took place, and partly to true edema. The lung substance is inelastic and pits on pressure. On section, fluid and froth resembling that found on the lips exude from the divided air passages. Minute subpleural hemorrhages are not infrequently present, and the pleural cavities may contain fluid. The stomach often contains water or other liquid which was involuntarily swallowed during attempts at respiration. Occasionally some of this fluid is forced by vital action into the intestines. With one exception, the remaining appearances are those met with after death from asphyxia. The exception is constituted by the blood, which is not only dark colored and fluid, as is usual after death from asphyxia, but is also diluted by the imbibition of water from the stomach and lungs.—(From Quain's *Dictionary of Medicine.*)

14. See QUESTION 11.

15. To constitute a "live birth" there must be (1) complete extrusion of the child from its mother's body, and (2) some certain sign of life. The latter would be established by one or more of the following: pulsation of the cord, beating of the child's heart, motions of the limbs, twitchings of the muscles, wrinkling of the brows, puckering of the face, opening of the eyes, even if respiration does not take place.—(From Witthaus and Becker's *Medical Jurisprudence*, etc.)

STATE BOARD EXAMINATION QUESTIONS.

UNIVERSITY OF THE STATE OF NEW YORK MEDICAL EXAMINATION.

ANATOMY.

1. Locate the following bony points: (*a*) processus mastoideus, (*b*) olecranon, (*c*) malleolus lateralis, (*d*) acromion, (*e*) spina ischiadica.

2. State the names and give the attachments of the muscles of mastication.

3. Describe the arteria femoralis as to (*a*) origin, (*b*) course, (*c*) branches.

4. Describe the vena cava inferior.
5. State the origin and give the course of the musculospiral nerve (nervus radialis) and mention the names of *two* of its terminal branches.
6. Describe the spleen and give its relations to surrounding structures and organs.
7. State the origin, course, and distribution to the stomach of the left vagus (pneumogastric) nerve.
8. Give the minute anatomy of the lobules of the liver.
9. What muscles are attached to (*a*) the posterior border of the ulna, (*b*) the spine of the scapula?
10. Give the topographic anatomy of (*a*) the internal abdominal ring, (*b*) the external abdominal ring.
11. Describe the articulation of the head of a rib, in the middle of the series, with the vertebræ.
12. Give a detailed description of the rectum. State the blood supply and the nerve supply of the rectum.

PHYSIOLOGY.

1. State the number of white corpuscles in a cubic millimeter of blood. State the function of white corpuscles.
2. State facts relating to the ratio between the oxygen absorbed and the carbon dioxide given off in respiration.
3. Describe the nervous mechanism of gastric secretion and of stomach movements.
4. Describe in detail each step in the digestion of a meal containing proteins, carbohydrates, fats, water, and inorganic salts.
5. Describe the character and the physiological function of the secretion of the sebaceous glands.
6. Which of the cranial nerves are nerves of special sense? Give the origin of each nerve mentioned.
7. Describe the advantages and the disadvantages of sugar as an article of diet for (*a*) those living a vigorous out-of-door life, (*b*) those living a sedentary life, (*c*) those who are poorly nourished.
8. Define a calorie. How many calories are produced by the average male adult in 24 hours?
9. Describe the development of the spermatozoa.
10. State the effect on respiration of (*a*) division of one phrenic nerve, (*b*) division of both phrenic nerves.
11. Describe the movements of the spleen and state what is known concerning its function.
12. State the average weight of feces evacuated by a normal male adult in 24 hours. What proportion of feces is (*a*) liquid, (*b*) solid?

CHEMISTRY.

1. Convert 41° Fahrenheit into centigrade degrees. State the Fahrenheit equivalent of zero centigrade.

2. Define (*a*) base, (*b*) salt, (*c*) acid. Illustrate, giving names and formulas.

3. Describe SO_2 as to (*a*) occurrence, (*b*) physical properties, (*c*) chemical properties, (*d*) uses as a disinfectant.

4. What is an alkaloid? What is the source of (*a*) atropine, (*b*) cocaine, (*c*) codeine?

5. Describe the process of manufacture of ethyl alcohol by fermentation and express in an equation the final reaction showing the formation of ethyl alcohol.

6. Describe a test for iodine.

7. Write the symbols of 10 elements and the formulas of 10 compounds, giving the name in each case.

8. State the physical and the chemical properties of ammonia.

9. Give the names, formulas, and chemical properties of *three* important potassium salts.

10. Where in the human system does lactic acid occur? How is lactic acid made?

11. Define carbohydrates and state their general properties. Where do carbohydrates occur in nature?

12. Describe chlorine as to (*a*) occurrence, (*b*) preparation, (*c*) properties, (*d*) important compounds, (*e*) chemical uses.

HYGIENE AND SANITATION.

1. Where should air inlets and air outlets for ventilating purposes be installed in a public hall? State reasons.

2. What are the essential requisites of a house water-filter?

3. What diseases are specially liable to be conveyed by the ingestion of milk?

4. State the procedure for disinfecting mattresses, blankets, and other heavy material of the sickroom.

5. What changes are effected in meats that are boiled? What points are to be observed in preparing soups?

6. Should the dead be buried or cremated? State reasons.

7. What controls the period of infectiveness of a disease? Illustrate.

8. State the course and relate the sequelæ of a successful vaccination.

9. What action have bacteria on sewage? What is the septic tank method of sewage purification?

10. How may articles of food and of drink be made sterile and safe for ingestion? Illustrate the procedure by at least *two* examples.

11. What pathological changes ensue from the constant use of alcohol as a beverage? Mention diseases the predisposition to which is increased by the habitual use of alcohol.

12. What is glanders (equinia)? How may glanders infection occur?

OBSTETRICS AND GYNECOLOGY.

1. Describe the nature and the functions of the amniotic fluid.
2. Give the management of the after-coming head in breech presentation.
3. Give the technique of obstetric asepsis and antisepsis during (*a*) pregnancy, (*b*) parturition, (*c*) the puerperium.
4. What are the causes of cystitis in the female? Describe methods of examination of the bladder of the female.
5. Give the management of the third stage of labor.
6. Differentiate erosion of the uterine cervix and ulceration of the uterine cervix. Give the etiology of each condition.
7. Describe the management of the various forms of placenta prævia.
8. Give in detail the immediate treatment of a severe laceration of the perineum.
9. Give the causes and the management of prolapsed cord.
10. What are the indications for the use of obstetric forceps?
11. Give the etiology of mastitis. What prophylactic measures should be applied to prevent mastitis during the puerperium?
12. Differentiate the ordinary morning sickness of pregnancy and the pernicious vomiting of pregnancy. What are the causes of the pernicious vomiting of pregnancy and what relation do they bear to the management of the condition?

SURGERY.

1. Describe tuberculous peritonitis. Give the surgical treatment of tuberculous peritonitis.
2. Give the surgical management of impacted fracture of the neck of the femur.
3. Give the technique of ether anesthesia. State the precautions to be observed and give the dangers and the danger signals in ether anesthesia.
4. Differentiate chancre and chancroid.
5. Discuss the dangers of expectant treatment of acute appendicitis.
6. Describe cholelithiasis and give its surgical treatment.
7. Give the surgical treatment of extensive burns.
8. Describe anthrax and give its surgical treatment.
9. Describe the operative technique and the after-treatment of penetrating wound of the stomach.

10. Describe a mechanical method of treating shock due to hemorrhage.
11. Give the signs and the symptoms of ectropion and state methods for its surgical relief.
12. Describe the objective and the subjective indications of compression of the brain.

DIAGNOSIS.

1. Describe the physical signs and the symptoms of acute pericarditis before and after effusion.
2. Give a clinical picture of epidemic cerebrospinal meningitis.
3. State the symptoms and the methods of diagnosis of dilatation of the stomach.
4. Describe the signs, symptoms, and usual course of toxic (commonly alcoholic) cirrhosis of the liver.
5. State the signs and the symptoms that warrant a diagnosis of diffuse (general) arteriosclerosis.
6. Give the clinical history of an average case of acute articular rheumatism.
7. State the symptoms of pus formation and retention.
8. In what diseases may enlargement of the spleen occur? Describe the methods of determining and identifying an enlarged spleen.
9. State the result of a microscopic examination of the blood in (*a*) typhoid fever, (*b*) malarial fever, (*c*) trichinosis.
10. Describe herpes zoster.
11. Differentiate cardiac asthma and bronchial asthma.
12. State the physical signs and relate some of the causes of ascites.

PATHOLOGY.

1. Describe the pathological changes in (*a*) simple fibrinous pleuritis, (*b*) serofibrinous pleuritis, (*c*) suppurative pleuritis.
2. What is the microscopic appearance of the affected tissues in acute hyperplastic splenitis?
3. Describe the alteration in structure of the mucosa in acute catarrhal enteritis.
4. How may carcinomata be disseminated through the lymph channels? State the appearance of the lymph vessels under such conditions.
5. Describe the hematozoon of estivoautumnal malaria and give its life history.
6. What organism is the probable exciting agent in syphilis? Give the macroscopic and the microscopic appearance of a syphilitic gumma in the liver.

BACTERIOLOGY.

7. In a suspected case of pulmonary tuberculosis what

laboratory methods should be employed to establish the diagnosis? Give the methods in detail.

8. What are pathogenic bacteria and by what means do they incite disease processes? Does cultivation on artificial media affect the virulence of pathogenic bacteria? Illustrate.

9. Describe in detail Gram's method of staining. Mention *two* species of micrococci that may be distinguished from each other by this method.

10. State the general characteristics of *Bacillus pestis*. How may a pure culture of *Bacillus pestis* be obtained?

11. Mention *three* pathogenic anaërobic bacteria that may be conveyed from the soil.

12. What is disinfection? Give in detail a method of determining the strength of a fluid disinfectant.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

University of the State of New York Medical Examination.

January 30, 1912.

ANATOMY.

1. (*a*) The *processus mastoideus* is behind the auditory meatus, on the mastoid portion of the temporal bone.

(*b*) The *olecranon* is the upper and back part of the ulna, at the back of the elbow-joint.

(*c*) The *malleolus lateralis*, or external malleolus, is situated at the lower extremity of the fibula, and forms the outer side of the ankle-joint.

(*d*) The *acromion* forms the outer end of the spine of the scapula, and overhangs the glenoid cavity; it can be felt immediately over the top of the shoulder-joint.

(*e*) The *spina ischiadica* is a triangular eminence near the center of the posterior border of the ischium.

2. The muscles of mastication are: Temporal, masseter, internal pterygoid, external pterygoid, and buccinator. The *masseter* arises from the zygoma and the malar process of the superior maxilla; it is inserted into ramus, coronoid process, and angle of lower jaw. The *temporal* arises from the temporal fascia and temporal fossa; it is inserted into the coronoid process of the lower jaw. The *internal pterygoid* arises from the pterygoid fossa and tuberosity of palate bone; it is inserted into inner side of the ramus and angle of the lower jaw. The *external pterygoid* arises from palate, superior maxillary, and sphenoid; it is inserted into neck of lower jaw. The *buccinator* arises from pterygomaxillary ligament and posterior alveolar

process of both jaws; it is inserted into the orbicularis oris.

3. The femoral artery is the continuation of the external iliac, beginning behind Poupart's ligament, passing down the front and inner side of the thigh, and terminating at the opening in the adductor magnus, where it becomes the popliteal artery. It passes through Scarpa's triangle. *Branches:* Superficial epigastric, superficial circumflex iliac, superficial external pudic, deep external pudic, muscular, anastomotica magna, and profunda femoris (with branches: external circumflex, internal circumflex, and three perforating).

4. The *inferior vena cava* is formed by the junction of the common iliac veins, at the side of the fourth lumbar vertebra; it passes up on the right side of the aorta, grooves the posterior border of the liver, and passes through the diaphragm to empty into the right auricle.

5. The *musculospiral nerve* is derived from the posterior cord of the brachial plexus and originates from the sixth, seventh, and eighth cervical nerves. At first it is behind the axillary and brachial arteries; it winds around the humerus in the musculospiral groove with the superior profunda artery. At the elbow it divides into the radial and posterior interosseous nerves.

6. The *spleen* is of an oblong, flattened form, the external surface being convex; on the inner surface is a vertical ridge dividing it into two parts, the posterior of which is applied to the outer surface of the left kidney, whilst the anterior one receives the tail of the pancreas, and lies against the cardiac end of the stomach. Near this ridge is a fissure, *the hilum*, where the vessels enter. The anterior border is notched, and the lower end is pointed, and rests on the costocolic ligament, situated in the left hypochondriac region. It is covered by peritoneum, except at the hilum, where it passes forward and inward in a double line enclosing the vessels, as the gastrosplenic omentum, to the fundus of the stomach. *Relations: Externally:* Diaphragm, which separates it from the ninth, tenth, and eleventh left ribs. *Internally: In front of the hilum:* Fundus of stomach. *Behind the hilum:* Left kidney, left suprarenal body. *Below the hilum:* Tail of pancreas. *Inferior surface:* Costocolic ligament and splenic flexure.—(*Aids to Anatomy.*)

7. The vagus has its origin in the groove between the olivary and restiform bodies and from the nucleus vagi in the floor of the fourth ventricle. It passes out of the jugular foramen with the spinal accessory nerve and goes vertically down the neck between the internal (and common) carotid and internal jugular. The left vagus then

enters the chest between the left carotid and subclavian. It crosses the arch of the aorta, goes behind the root of the left lung, along the front of the esophagus, and passes to te anterior surface of the stomach and also sends filaments to the lesser curvature.

8. A lobule of the liver is about 1-20 to 1-12 inch in diameter. It has a darkish red center and a lighter circumference. The center is occupied by an intralobular vein which collects the blood from the capillaries of the lobule and flows into the sublobular vein, which latter opens into the hepatic vein. Around the lobules are the interlobular veins; these are branches of the portal system; capillaries passing from the circumference to the center of the lobule connect the interlobular and intralobular veins. Between the network of capillaries in the lobule the hepatic cells are packed.

9. *To the posterior border of the ulna* are attached: Triceps, anconeus, supinator brevis, extensor ossis metacarni pollicis, extensor indicis, flexor carpi ulnaris, and extensor carpi ulnaris. To the spine of the scapula are attached: Trapezius and deltoid.

10. *Internal abdominal ring:* "An oval opening lying in the transversalis fascia, half way between the anterior superior iliac spine and symphysis pubis, and about 1.3 cm. (½ inch) above Poupart's ligament. Superior and external boundary—curved fibers of transversalis. Inferior and internal boundaries—deep epigastric vessels. Transmits spermatic cord in male—and round ligament in female. Infundibuliform process of fascia transversalis strengthens its opening."

External abdominal ring: "A triangular opening in aponeurosis of external oblique immediately above and just external to crest of os pubis. Bounded, inferiorly, by crest of os pubis—superiorly by intercolumnar fibers, strengthened by intercolumnar fascia; internally by inner or superior pillar; externally by outer or inferior pillar. Transmits spermatic cord in male and round ligament in female."—(Bickham's *Operative Surgery.*)

11. *Articulation of head of rib with body of vertebra:* Arthroidal joint held together by the following ligaments:

The *anterior costovertebral* or *stellate ligament* is composed of three fasciculi, which radiate from the anterior surface of the head of the rib. The *superior* fasciculus passes to the body of the vertebra above; the *inferior* fasciculus to the body of the vertebra below; the *middle* fasciculus to the intervertebral substance.

A *capsular ligament* surrounds articulation between the head of the rib and the articular surface formed by two vertebræ.

The *interarticular ligament* divides the joint into two

parts, each of which has a separate *synovial membrane*. It passes between ridge on head of rib and intervetebral substance.—*(Aids to Anatomy.)*

12. The *rectum* is the lowest part of the alimentary canal, and extends from the sigmoid flexure to the anus. It is about six inches in length, and is divided into three portions. The upper half only is invested with peritoneum. The upper third rests upon the sacral plexus and the pyriformis muscle; the middle third is in relation with the bladder, prostate, and seminal vesicles (in the female with uterus and vagina); the lower third is surrounded by the sphincters. It is not sacculated; the arteries are the hemorrhoidal branches of the inferior mesenteric, internal iliac, and internal pudic; the veins form the hemorrhoidal plexus, and empty into the inferior mesenteric and internal iliac veins. The nerves are from the mesenteric, hypogastric, and sacral plexuses of the sympathetic system; twigs are also derived from the third, fourth, and fifth sacral nerves.

PHYSIOLOGY.

1. There are, normally, about 7,000 to 10,000 white corpuscles in a cubic millimeter of blood.

The functions of the white corpuscles are to: (1) Serve as a protection to the body from the incursions of pathogenic microorganisms; (2) take some part in the process of the coagulation of the blood; (3) aid in the absorption of fats and peptones from the intestine, and (4) help to maintain the proper proteid content of the blood plasma.

2. The ratio between the oxygen absorbed and the carbon dioxide given off in respiration is called the respiratory quotient. Thus inspired air contains 21 parts of oxygen, expired air 16; inspired air 0.04 of CO_2, expired air 4.04. The respiratory quotient is represented by the fraction $\frac{4.04 - 0.04}{21 - 16} = .8$. This is the normal figure, but the ratio is very variable, depending on age, temperature, food, air, and exercise.

"There are various reasons which account for these differences. It is to be borne in mind, in the first place, that the sources of carbon dioxide in the animal body are numerous. The oxygen which is absorbed at any given time does not immediately appear in the carbon dioxide given off; it may be absorbed and enter into combinations, which may retain it for a considerable time; so that at any given time the amount of oxygen absorbed may be greater than that given off in the carbon dioxide or *vice versa*. Then, too, more CO_2 is formed in proportion to the amount of oxygen absorbed by t' ⁻ decomposition of

some substances than others. Thus when carbohydrates constitute the diet the amount of oxygen which they contain is enough to satisfy their hydrogen, but fats and proteids need more, and in the formation of water they use up oxygen; from this it follows that more oxygen is absorbed during an animal than during a vegetable diet. When the amount of carbon dioxide given off equals the amount of oxygen absorbed, the respiratory quotient is 1. It is found that before feeding the quotient is 0.84 to 0.89; when meat or fat is given, 0.76; with potatoes, 0.93; and with glucose, 1.03. The respiratory quotient is higher in adults than in children; during the day than at night; during wakefulness than during sleep; during activity than during rest." (From Raymond's *Physiology*.)

3. The *nervous mechanism of gastric secretion* is probably reflex. The stimulus is the presence of food and its passage into the stomach; the afferent nerves are fifth and ninth cranial, perhaps also the vagus and sympathetic; the center is in the nucleus of the vagus; the efferent nerves are the vagi; and the terminal organs are the gastric glands.

Movements of the stomach: "When devoid of food, the stomach remains in a condition of slight tonic contraction, the mucous membrane being thrown into folds. *X*-ray observations have shown that in the empty condition only the pear-shaped upper third of the stomach contains gas, the rest of the organ passing to the pylorus in the form of a collapsed tube, which corresponds in position to the small curvature of the filled stomach. Food when swallowed causes relaxation of the walls of the stomach. Moreover, the food introduced at different times bears different relations with regard to the stomach walls. That is to say, food first introduced is spread round the stomach, forming a lining to the mucous membrane. Food introduced later is retained encapsuled like a ball by its enveloping layer of mucin. This fact is of extreme importance, for the later food is protected from the gastric juice, and the admixed saliva, which is inactive in an acid medium, is enabled to prolong its activity. Cannon maintains that salivary digestion may proceed even for an hour or more after the food is in the stomach. Soon after the introduction of food into the stomach, movements begin. These proceed at first very gently, but later on increase in intensity. They are confined entirely to the pyloric portion of the stomach. Cannon, by his recent feeding experiments with bismuth subnitrate and *x*-rav observations, has succeeded in observing the movements of the stomach very closely. They consist of a series of contractions, which proceed in a peristaltic manner. The sphincter at the commencement of the pyloric vestibule

contracts, in a ring-like manner, and this contraction is propagated over the pyloric portion. The time taken in transit is twenty-six seconds (in the cat), and the successive contractions follow one another at ten seconds intervals. By this means the food in the pyloric region of the stomach is thoroughly disintegrated and mixed with the gastric juice. When this condition is reached the pylorus is relaxed at certain intervals, and portions of the acid chyme are ejected into the duodenum. Immediately succeeding this, the pylorus again enters into tonic activity. The relaxations of the pylorus coincide with the arrival, at that place, of a wave of contraction, although they are irregular; for every peristaltic wave there is a corresponding pyloric inhibition. The mechanism of pyloric regulation will be discussed later. It is in the pyloric vestibule of the stomach that the food is so thoroughly mixed with the gastric juice, and it is here also that solid food is most likely to injure the mucous membrane of the stomach, and so predispose to the formation of gastric ulcer. So far no mention has been made of the functions and movements of the fundus and body of the stomach. These portions do not undergo contractions in rhythmic series, but the musculature enters into a condition of maintained strong tonicity. The function of this is obvious, and is to replenish the pyloric triturating apparatus with further materials from the fundus and body store."—(Lyle's *Physiology.*)

4. The *proteids* are digested in the stomach (by the pepsin) and in the small intestine (by the trypsin); the *carbohydrates* are digested in the mouth (by the ptyalin) and in the small intestine by the amylopsin; the *fats* in the small intestine (by the steapsin and the bile).

5. The secretion of the sebaceous glands is the sebum. *Sebum* is a fatty material; acid in reaction; contains isocholesterin, albumin, and fat. Its function is to keep the skin and hairs soft and pliable; it serves as a protection, and is an aid in the maintaining of body temperature; it may also be excrementitious.

6. *Cranial nerves of special sense:* First, or olfactory, special sense of smell; second, or optic, of sight; eighth, or auditory, of hearing.

Olfactory arises from the under surface of the frontal lobe, in front of the anterior perforated space.

Optic arises from the posterior part of the optic thalamus and the corpora geniculata.

Auditory arises from the olive and restiform body.

7. SUGAR AS AN ARTICLE OF DIET. (*a*) *Vigorous persons leading an outdoor life. Advantages:* The body sugars are an ever-ready source of energy, and as these are most readily and economically formed from ingested sugar

persons leading a vigorous outdoor life require more than the average. *Disadvantages:* Sugar cannot be considered a substitute for the protein needed to replace that consumed in the wear and tear of life, and therefore sugar must not be used as the sole article of diet.

(*b*) *Persons living a sedentary life. Advantages:* Although these people do not require a great deal of handy fuel, nevertheless less protein is required to maintain the normal balance if a moderate quantity of sugar is taken. *Disadvantages:* Excessive sugar leads to a lessened intake of protein and fat, and therefore diminishes the mineral constituents (which usually follow with the fats used for food). Furthermore, in diminishing the fat intake it tends to produce bile stasis, with its usual results. Still further, an excess of sugar leads to intestinal fermentation with distension.

(*c*) *Persons who are poorly nourished. Advantages:* Here especially is a great demand for just such an easily available source of energy as is supplied by sugar. Sugar is easily digested and promotes the deposition of fat, and spares body protein. *Disadvantages:* Same as in (*b*), with special emphasis on the interference with the taking of the necessary mineral constituents.

8. A calorie is the amount of heat required to raise a gram of water through one degree Centigrade. The average male adult produces about 40,000 to 50,000 calories for each kilogram of his weight during 24 hours.

9. *Development of spermatozoa:* "Spermatozoa are modified cells produced in the testicles or male generative glands. They are formed from the spermatogonia or sperm mother cells which are derived from the primitive germ cells of the testicle, and which ultimately produce the spermatocytes of the first order, the latter constituting the immediate point of departure in the production of a spermatozoon, and corresponding therefore with the ovum or oocyte of the first order immediately before its maturation commences. The daughter cells of the spermatocytes of the first order are spermatocytes of the second order, and their descendants, the spermatids, are the granddaughter cells of the spermatocytes of the first order. The spermatids become closely associated with special sustentacular or nurse cells, and during this association are converted into spermatozoa."—(Cunningham's *Anatomy.*)

10. "*Section of one phrenic nerve* causes paralysis of the corresponding side of the diaphragm; *section of both phrenics* is followed by paralysis of the entire diaphragm. So important are these nerves in respiration that in most cases after section death occurs from asphyxia within several hours. In such cases not only is the work of inspiration thrown upon the other inspiratory muscles, but the

effectiveness of the latter is greatly compromised by the relaxed condition of the diaphragm, which permits of its being drawn into the thoracic cavity with each inspiration, thus hindering the expansion of the lungs." (*American Text-Book of Physiology.*)

11. *Movements of the spleen:* "It has been shown that there is a slow expansion and contraction of the organ synchronous with the digestion periods. After a meal the spleen begins to increase in size, reaching a maximum at about the fifth hour, and then slowly returns to its previous size. This movement, the meaning of which is not known, is probably due to a slow vasodilatation, together, perhaps, with a relaxation of the tonic contraction of the musculature of the trabeculæ. In addition to this slow movement Roy has shown that there is a rhythmical contraction and relaxation of the organ, occurring in cats and dogs at intervals of about one minute. Roy supposes that these contractions are effected through the intrinsic musculature of the organ—that is, the plain muscle tissue present in the capsule and trabeculæ—and he believes that the contractions serve to keep up a circulation through the spleen and to make its vascular supply more or less independent of variations in general arterial pressure."—(Howell's *Physiology.*)

"It was subsequently shown by Schäfer and Moore that the splenic volume is extremely responsive to all fluctuations of the arterial blood-pressure; that though the spleen may passively expand and recoil in response to the rise and fall of the blood-pressure, nevertheless the reverse conditions may obtain: viz., that the splenic volume may diminish as the pressure rises, if the splenic arterioles contract simultaneously with the contraction of the arterioles generally. On the contrary, the splenic volume may increase coincident with a dilatation of the splenic and systemic arterioles." (Brubaker's *Physiology.*)

The function of the spleen: The following theories have been held: (1) It is a source of production of the white blood corpuscles; (2) it is a source of production of the red blood corpuscles during fetal life; (3) it is a place where the red blood corpuscles are destroyed; (4) uric acid is produced in the spleen; (5) an enzyme is produced in the spleen and is carried by the blood to the pancreas, where it converts the trypsinogen into trypsin.

12. The average weight of feces evacuated by a normal male adult in 24 hours is about 7 or 8 ounces; of this about 70 to 80 per cent. is liquid, and about 20 to 30 per cent. is solid.

CHEMISTRY.

1. To convert Fahrenheit to Centigrade, we subtract 32, multiply by 5, and divide by 9.

$$\frac{(41-32)\times 5}{9}=\frac{9\times 5}{9}=5$$

So 41° F. = 5° C. 32° F. is the equivalent of zero C.

2. (*a*) *Bases* are ternary compounds capable of entering into double decomposition with an acid to produce a salt and water. *Examples:* Potassium hydroxide, KOH; Calcium hydroxide, $Ca(OH)_2$.

(*b*) *Salts* are substances formed by the substitution of an electropositive element for part or all of the replaceable hydrogen of an acid. *Examples:* Sodium nitrate, $NaNO_3$; Monopotassic sulphate, $KHSO_4$.

(*c*) *Acids* are compounds of an electronegative element or radical with hydrogen, part or all of which hydrogen they can part with in exchange for an electropositive element, without formation of a base. *Examples:* Sulphuric acid, H_2SO_4; nitric acid, HNO_3.

3. *Sulphur dioxide* occurs in volcanic gases and in solution in some mineral waters. It is a colorless, suffocating gas, with a disagreeable taste; it is very soluble in water, soluble in alcohol, and liquefies at 14° F. It is neither combustible nor a supporter of combustion; it is a reducing agent, being itself oxidized to sulphuric acid. It combines with water to form true sulphurous acid.

As a disinfectant: "Sulphur (dioxide, SO_2), though not so positive in its action as chlorine, is much more frequently employed on account of the lesser risk and trouble connected with it. It probably kills the germs not containing spores if sufficiently concentrated and in the presence of moisture, and is, therefore, useful in the fumigation of rooms and of articles that cannot be subjected to steam heat or chemical solutions. But it will bleach or tarnish many articles, and for this reason and the fact that it is much inferior to formaldehyde, it will hereafter probably be almost entirely supplanted by the latter whenever that can be obtained. To secure sufficient concentration at least three pounds of sulphur should be burned for every 1000 cubic feet of air-space, care, of course, being taken that there may be no risk of igniting the floor or any articles in the room." (Egbert's *Hygiene.*)

4. *An alkaloid* is an organic, basic, nitrogenous substance, alkaline in reaction, and capable of combining with acids to form salts in the same way that ammonia does. *Atropine* is derived from *Atropa belladonna; Cocaine,* from *Erythroxylon coca; Codeine,* from opium.

5. The process of manufacturing ethyl alcohol is divisible into three parts: (1) The grain is *malted, i.e.* it is caused to germinate. In this stage of the process a peculiar substance, called *diastase,* is produced, which causes the transformation of starch into glucose. (2) The sac-

charine liquid is brought in contact with *yeast*, a plant whose nutrition is attended with *fermentation*, by which glucose is decomposed into alcohol and carbon dioxide: $C_6H_{12}O_6 = 2C_2H_5OH + 2CO_2$. (3) The alcohol is more or less perfectly separated from other substances by distillation.

6. Free iodine colors starch paste a dark violet-blue.

7. Hydrogen, H; Oxygen, O; Carbon, C; Nitrogen, N; Mercury, Hg; Silver, Ag; Lead, Pb; Sulphur, S; Arsenic, As; Iron, Fe.

Sodium chloride, NaCl; Potassium iodide, KI; Hydrogen dioxide, H_2O_2; Sulphuric acid, H_2SO_4; Nitrogen monoxide, N_2O; ammonia, NH_3; Phosphoric acid, H_3PO_4; Carbon dioxide, CO_2; Silver nitrate, $AgNO_3$; Mercurous chloride, Hg_2Cl_2.

8. *Ammonia* is a colorless gas, with a pungent odor and an acid taste. It is readily soluble in water, aso in alcohol and in ether. On being heated it is decomposed into nitrogen and hydrogen; it is not readily combustible, but it will burn in an atmosphere of oxygen.

9. (1) *Potassium iodide*, KI, is a transparent crystalline solid, anhydrous, soluble in water and in alcohol; it is decomposed by chlorine, and by nitric and nitrous acids. Its solutions dissolve iodine and many metallic iodides.

(2) *Potassium chlorate*, $KClO_3$, is a transparent crystalline solid, anhydrous, soluble in water; at a high degree of heat it fuses, and if heated still further it decomposes into potassium chloride and perchlorate. It is an active oxidizing agent, and if carelessly mixed with certain oxidizable substances an explosion may result.

(3) *Potassium permanganate*, $K_2Mn_2O_8$, is a crystalline solid, soluble in water, giving it a mahogany color; it is a valuable oxidizing agent.

10. *Lactic acid* is found in the stomach during the digestion of carbohydrates. Lactic acid is made by oxidation of alpha-propylene glycol:

$CH_3.CHOH.CH_2OH + O_2 = CH_3.CHOH.COOH + H_2O$.

Sarcolactic acid is found in muscular tissue (during contraction), spleen, lymphatic glands, thyroid, thymus, blood, and bile.

11. *Carbohydrates.* "The name carbohydrates was originally given to the group of compounds found chiefly in vegetables, and containing in the molecule *six* or a *multiple of six* atoms of carbon in combination with hydrogen and oxygen in the proportion to form water, as in glucose, $C_6H_{12}O_6$. The name is not well chosen, as it indicates carbon in combination with water, and also because at present members of the group are known which contain hydrogen and oxygen in other proportions than that of water. For convenience the name is retained, and

applies to a group of substances including the various sugars, starches, gums, etc. They form the chief solid constituent of vegetables, and also are products of animal life, easily ferment or are readily converted into fermentable substances, are neutral, non-volatile, and, if soluble, optically active. They are usually white solids, and the sugars have a sweet taste. They are usually strong reducing agents, and by oxidation form saccharic, mucic, and oxalic acids." (McGlannan's *Organic Chemistry.*)

12. *Chlorine* does not occur free in nature, but is chiefly found in sodium chloride. It is prepared by heating together manganese dioxide and hydrochloric acid:

$$MnO_2 + 4HCl = MnCl_2 + 2H_2O + Cl_2.$$

Chlorine is a greenish-yellow gas, with a very penetrating and suffocating odor; it is heavier than air, soluble in water, and is very irritant to the air passages. It combines readily with the elements, a candle burns in chlorine with a faint flame and dense smoke; in the presence of water it is an active bleaching and disinfecting agent. *Important compounds* are: Hydrochloric acid, chloric acid, perchloric acids, and their salts; also chloroform and chlorals; chlorine is used for bleaching and disinfecting.

HYGIENE AND SANITATION.

1. *Inlets and outlets for ventilating:* "There is considerable difference of opinion as to the best locations for inlets and outlets, and as the conditions are necessarily different in every case and so many factors are to be considered, it is difficult to lay down any general rules. It should be an aim, however, to have the air well distributed and to have no direct draughts from the inlets either upon the occupants or to the outlets. Usually the outlets should be located near the top of the room, owing to the tendency of the used air to rise, and because, in unventilated rooms, the foulest air for some time after its contamination will be found nearest the ceiling. The products of combustion from lights, etc., will also practically all be in the upper strata of air. If, however, provision is or can be made for a constant and sufficiently strong aspirating force in the outlet ducts, it may be advisable to withdraw the used air from near the floor level and below the inlet openings, though not in too close proximity to them, since in this way a more thorough distribution of the incoming air and a greater dispersion of its contained heat are secured. The location of the inlets should depend on the temperature of the incoming air; if it is cold it should be admitted near the ceiling, so that it may diffuse and be partially warmed before reaching the inmates of the room; if it is warmed it may come in near the floor or below the middle level of the room."—(Egbert's *Hygiene.*)

2. *The requisites of a good filter* are (according to Parkes): (1) That every part shall be accessible for cleansing or renewing the medium. (2) That the filtering medium shall have a sufficient purifying power and be present in sufficient quantity. (3) That the medium gives nothing to the water favoring the growth of low forms of life. (4) That the purifying power be reasonably lasting. (5) That there be nothing in the construction of the filter itself capable of undergoing putrefaction or of yielding metallic or other impurities to the water. (6) That the filtering material shall not clog, and that the flow of water be reasonably rapid; to which may be added: 7. That the filtering medium be such that it can be readily cleansed and sterilized, or else so cheap that the removal and replenishing may not be neglected when necessary on account of the expense.

3. *Diseases specially liable to be conveyed by the ingestion of milk:* Tuberculosis, typhoid fever, scarlet fever, diphtheria, tonsillitis, cholera, and gastrointestinal disorders.

4. Disinfection of mattresses, blankets, and other heavy material is best effected by steam under pressure; of course. the ideal plan would be to burn the articles.

5. *When meat is boiled* the hemoglobin is decomposed, the raw appearance is removed, the proteids are coagulated, the salts and extractives are dissolved in the water, the fats are split up (physically) and float on the surface of the water; the meat is made more tender, and the fibrous connective tissue is dissolved, thus allowing the fibers of the meat to become separated.

Points to be observed in preparing soups are, according to Friedenwald and Ruhrāh: Both meats and vegetables should be cut into small pieces. The soup should be started with cold water poured over the meats and the heat applied gradually and the soup allowed to simmer, in order to dissolve as much of the nutriment as possible. If heated rapidly the albumin in the meat coagulates, and little but the extractives passes into the soup. The vegetables are added when the soup is nearly done. The fat is then to be removed.

6. The dead should be cremated. *The advantages of cremation over earth burial* are: (1) Economy; cremation is very much cheaper, and there is no need for the community to purchase large tracts of valuable land for the accommodation of the dead. (2) Health; it is said that earth-burial causes the air to become poisoned, the burial grounds to become offensive, the soil to become laden with disease germs of every description, water to become poisoned, and diseases to be directly originated or

propagated. (3) Body-snatching and desecration of tombs will be impossible.

7. The period of infectiveness of a disease is controlled by: The number and virulence of the bacteria causing the disease, the vitality and ease with which the bacteria can enter another person. Most of the pathogenic bacteria live only a short time outside the body; hence, speedy contact (either direct or indirect) is necessary.

8. After vaccination a papule forms on the second or third day; it becomes an umbilicated vesicle on the fifth or sixth day; about the ninth day it becomes purulent and an areola forms around it; at the end of the third week it dries up, the scab falls off, and leaves a permanent scar. The neighboring lymphatics may enlarge, the arm swells, and some fever may be present.

9. "The actual changes which take place in sewage, as the result of bacterial action, are somewhat complex and obscure, but they have been aptly described by Rideal as consisting mainly of three stages. In the first stage, or that of anaërobic liquefaction and preparation by hydrolysis, the albuminous matters, cellulose, and fats are broken up into soluble nitrogenous compounds, fatty acids, phenol derivatives, gases, and ammonia. In the second stage, or that of semi-anaërobic disintegration of the intermediate dissolved bodies, a further formation of ammonia, nitrites and gases takes place. In the third stage, or that of aeration and nitrification, ammonia and carbon residues are changed into water, carbon dioxide, and nitrates."

A septic tank is a specially constructed tank for the treatment of sewage; in it the sewage as such is destroyed, and new substances are built up in its place. In *Cameron's septic tank* system "the sewage is first led into a tank from which air and light are excluded. Digestive changes take place in the sewage within this tank as the result of anaërobic bacterial action, which is favored by the darkness, the absence of air, and the perfect stillness at which the sewage is maintained. The solid matter is rendered soluble and dissolved." (Notter and Firth's *Hygiene*.)

10. Meat and fish can be frozen and salted; vegetables and fruits can be dried.

11. The constant use of alcohol as a beverage may produce changes (chiefly cirrhotic) in the blood-vessels and viscera, may weaken vital organs, produce premature senility, weaken bodily resistance.

The habitual use of alcohol increases the predisposition to cirrhotic liver and kidney, gastric diseases, tabes dorsalis, nephritis, endarteritis, multiple neuritis, chronic pachymeningitis.

12. *Glanders* is an infectious disease caused by the bacillus mallei. It generally occurs through the inoculation of

an abraded surface by the nasal mucous membrane of an infected horse, etc.

OBSTETRICS AND GYNECOLOGY.

1. The *liquor amnii* is the fluid contained in the amniotic sac; it is alkaline in reaction, has a specific gravity of about 1.001 to 1.008, its quantity is variable, but is generally about two pints. It consists chiefly of water, but contains small amounts of albumin, epithelial cells, urea, phosphates, chlorides, etc. Its source is unsettled.

Function: (*a*) *During Pregnancy:* (1) As a protection to the fetus against pressure and shocks from without. (2) As a protection to the uterus from excessive fetal movements. (3) It distends the uterus, and thus allows for the growth and movements of the fetus. (4) It receives the excretions of the fetus. (5) It surrounds the fetus with a medium of equable temperature, and serves to prevent loss of heat. (6) It prevents the formation of adhesions between the fetus and the walls of the amniotic sac. (7) It has been supposed, by some, to afford some slight nutrition to the fetus. (*b*) *During Labor:* It acts as a fluid wedge, and dilates the os uteri and the cervix; it also slightly lubricates the parts.

2. "The body of the child is wrapped in a warm napkin and placed astride the operator's arm. The index and middle fingers are on the canine fossa on each side of the child's nose. Upward pressure is made at the same time with the fingers of the other hand upon the occiput. By raising the trunk the head is rolled out over the perineum. The head must be completely rotated before this method can be used. This method is particularly adapted for extraction when the fetal head has entered the pelvis." —(Landis' *Obstetrics.*)

4. *Causes of cystitis in the female:* Various pathogenic bacteria, foreign bodies, traumatism, retention of urine, unclean catheters, cold.

"The female urethra is short and easily dilated. This makes the inside of the bladder accessible both to (*a*) touch and (*b*) sight. Visual examination of the interior of the bladder has been made practicable by Pawlik. The inside of the bladder can be looked at through a small speculum without dilating the urethra and without anesthesia. To get a good view the urethra must be dilated and a large speculum used, and this cannot be done without anesthesia. The anesthetized patient is held in the lithotomy position with her pelvis well raised. The bladder is emptied. Then the urethra is dilated with Hegar's dilators. This may be done up to No. 17 (that is, a dilator 17 millimeters in diameter) without risk of subsequent incontinence of urine. Then a speculum, a polished

metal tube with a trumpet-shaped end, provided with an obturator, is inserted. The examiner puts on a laryngoscopic mirror. He may be opposite a window or he has a lamp so placed that the light from it may be reflected by the mirror into the speculum. The mucous membrane is then dried by swabbing it with cotton-wool. When this has been done the inside of the bladder can be inspected. By turning the speculum about 30° to one side or the other the urethral orifices can be brought into view. A suitable catheter can be passed into it. Sometimes the ureteral orifice can be identified only by seeing urine escape from it. When inflamed it may be more easily seen as a round hole in a circular eminence, and if the renal pelvis be inflamed the flow of pus will mark out the ureteral orifice more distinctly than that of urine."—(Herman's *Handbook of Gynecology.*)

5. In the *third stage of labor* the physician should seize the fundus of the uterus through the abdominal wall and knead and rub it until it contracts vigorously; then he should press it down in the direction of the axis of the pelvic inlet. This should last for about a quarter of an hour after the child is born. The placenta, after it is expressed, should be carefully taken by the physician so as to be sure that it is *all* expelled; at the same time care must be taken that no particle of membrane remains behind. Fluid extract of ergot may be administered.

6. An *erosion* of the cervix is an area on the vaginal surface of the cervix which is covered with columnar epithelium, and consequently presents a reddened, inflamed appearance. Some confusion has resulted from the application of the term *ulceration* to this condition. There is no ulcer and no granulating surface, for the whole area is still covered with epithelium. The erosion is caused by an irritating vaginal or uterine discharge (*e.g.* gonorrhea, endometritis). An *ulcer* of the cervix presents a clear-cut border, sometimes raised and indurated, and the base of the ulcer is formed by granulation tissue; the cervix has lost some of its epithelial covering. It may be caused by irritation from pessary or discharge, chancroid infection, syphilis, tuberculosis, or malignant disease. (From Crossen's *Diseases of Women.*)

7. If placenta prævia occurs before term rest in bed, and tampons in the vagina are indicated. At term the placenta (if marginal) should be pushed on one side by the fingers, the members ruptured, and the child delivered. If centrally placed a hole should be made in it and the child promptly delivered. Version may be necessary to hasten matters.

8. *Lacerated perineum:* "The parts are cleansed and a pledget of sterile cotton or gauze pushed up the vagina to

stop any flow from the uterus obscuring the wound. The sutures (preferably of aseptic silk) are passed with a moderately curved needle about two inches long as follows: Beginning at the posterior end of the laceration (that nearer the anus), the needle enters the skin near the edge of the wound and follows a circular course until its point appears at the very bottom of the laceration (a finger of the other hand in the rectum guarding against its penetrating that canal); it then enters the opposite side of the laceration at the bottom of the wound and comes out of the skin opposite its point of entrance, having followed a similar circular course to that pursued on the other side where it first went in. The ends are *loosely* tied or secured by catch-forceps, until the requisite number of sutures are passed in a similar manner (half an inch apart), when the wound is again cleansed, the vaginal plug removed, and the sutures tied tightly enough to coapt the parts without injurious constriction, the order of succession in tying being that in which the sutures were passed.

In "complete" lacerations—those of the third degree—through the sphincter ani to the rectum, the operation is more difficult. The rectal tear is first stitched with *catgut* sutures (a short, curved needle being used) and going through the rectal wall only. The sutures are tied on the inside, so that the knots are on the mucous membrane of the bowel. They begin from above and come down to the sphincter ani, the cut ends of which are drawn out with a tenaculum while the sutures penetrate them. These *catgut* sutures need not be removed; they will digest in the tissues and disappear of themselves. The posterior wall of the vagina is next sutured with fine silk, from above downward toward the hymen. Finally, skin sutures through the perineum itself, including muscles of the pelvic floor (as just described for lacerations of the first and second degrees) complete the operation. The silk sutures may be removed in about a week. Antiseptic dressings are applied as after an ordinary labor, extra care being taken to keep the wound aseptically clean by daily irrigation with the creolin solution."—(King's *Obstetrics.*)

9. Prolapsed cord. *Causes:* Excessive liquor amnii, low implantation of placenta, twin pregnancy, excessive length of cord, fetal head too small. *Treatment:* The funis should be pushed up above the inlet in the interval between pains, and when the presentation is forced down by a contraction it will probably be retained. This can be done by the fingers or by repositors invented for the purpose, and may be aided by placing the woman in the knee-chest posture. It can also be done by carefully placing a loop of cord around the funis, attaching it to a moderately hard catheter, and pushing it gently back into the

empty pelvic diameter. If the advance of the presentation does not retain it a small piece of sponge passed between the head and the inlet will often succeed. If the cord is surely pulseless it may be let alone, but if the child is alive and the funis cannot be retained prompt artificial delivery is indicated.—(Landis' *Obstetrics.*)

10. *Indications for the use of forceps* are: "(1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¼ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A.—Dystocia due to (*a*) occipitoposterior, (*b*) mentoanterior face, (*c*) breech arrested in cavity. B.—Evidence of fetal exhaustion (pulse above 160 or below 100 per minute). (4) *Accidental complications:* Hemorrhage; prolapsus funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both."

11. Mastitis is due to infection. The nipple should be kept absolutely clean and dry. During pregnancy it should be hardened with alcohol. The infant should not be allowed to go to sleep with the nipple in his mouth, and the nipple should be washed and dried after each nursing. Doctor, nurses, and patient should not touch the breast more than is necessary.

12. The ordinary morning sickness is a mere symptom, has no significance, and seldom gives any trouble or needs treatment. The pernicious vomiting is very severe, is probably due to reflex nervous disturbances. It may endanger the life of mother and child, and may necessitate the interruption of the pregnancy. If the cause can be found it should be removed, and every possible care must be taken of the woman. Other *causes of vomiting in pregnancy* are: (1) Reflex disturbance, due to rapid growth and excessive distention of the uterus; (2) disease or displacement of uterus, tubes and ovaries; (3) disease of pelvis or gastrointestinal tract; (4) excessive sexual intercourse; (5) renal disease or disturbance.

SURGERY.

1. "*Tuberculous peritonitis* is more common in the young than in the old people, and is usually secondary to tuberculous ulceration of the intestine or tuberculous lesions elsewhere. Three main varieties occur: 1. The ascitic variety, in which the peritoneum is studded with tubercles, some of which are caseating, and there is an abundant exudation of straw-colored fluid, which may be free or encysted by adhesions. 2. The fibrous variety, in which

adhesions of the intestines and omentum are a marked feature. The omentum is often curled up into a sausage-like tumor, which lies transversely above the umbilicus. The adhesions may lead to obstruction by constricting or kinking the intestine. 3. The ulcerous variety, in which perforations occur between neighboring coils of intestine (fistula bimucosa), or a fecal fistula forms at the umbilicus. *Symptoms:* The general health becomes depressed and constipation alternates with diarrhea. There is some abdominal pain, and wasting soon becomes marked. The abdomen is tender, and may or may not contain free fluid. *Treatment* is by hygiene and good feeding at first. If this fails, simple laparotomy often cures the ascitic variety, sometimes the fibrous, but seldom the ulcerous. It is not necessary to wash out the abdominal cavity, but only to drain away the fluid and stitch up the opening. Laparotomy may also be required to relieve intestinal obstruction, fecal fistula, or localized abscesses." *(Aids to Surgery.)*

2. Opinions differ as to the surgical treatment of impacted fracture of the neck of the femur. Rose and Carless say: "Impacted fractures should rarely be broken up, except in young and active people." Da Costa says: "In impacted extracapsular fracture it is best to pull apart the impaction if the patient is in good physical condition."

3. The patient is placed in the recumbent posture, with the clothing loosened about the neck, and all articles, including artificial teeth, removed from the mouth. The bladder should be emptied just before the anesthetic is given. Oxygen, stimulants, a hypodermic syringe, a mouth gag, and tongue forceps should be at hand.

Use a clover inhaler. Clean and blow up the face-piece. Allow breathing of simple air without the bag. Allow breathing in and out of the bag without ether. Turn on the ether gradually. Hold the face on one side to allow for escape of saliva. Moderate cyanosis may be ignored until the patient is under full anesthesia. After anesthesia has become complete allow one breath of air for every five inspirations. For prolonged maintenance of anesthesia the indicator should be kept at the lowest possible proportion of ether.

Danger signals: Widely dilated and immobile pupils; dusky pale complexion; shallow, irregular or jerky breathing.

4. CHANCRE.	CHANCROID.
First lesion of a constitutional disease, viz., syphilis.	A local disease.

CHANCRE.	CHANCROID.
Due to syphilitic infection	Due to contact with secretion from chancroid.
Generally a venereal infection.	Always a venereal infection.
May occur anywhere on the body.	Nearly always on genitals.
Period of incubation never so short as ten days.	Period of incubation always less than ten days (generally about three.)
Generally single.	Generally multiple.
Not autoinoculable.	Autoinoculable.
Secretion slight.	Secretion profuse and purulent.
Slightly or not at all painful.	Generally painful.
As a rule only occurs once in any patient.	May reoccur in same patient.
Buboes are painless and seldom suppurate.	Buboes are painful and usually suppurate.

5. If the expectant plan is not a success it may mean death; for every moment of delay makes the chances of a successful operation less. The earlier the operation the less the mortality, the less also the risk of infecting the peritoneum, the easier and simpler the operation. The average expectant treatment, while sometimes apparently successful, often deprives even the operative method of its fair chances of success.

6. *Gall-stones.* "While the calculus remains free in the gall-bladder, usually there are no symptoms. Impaction of the stone in the common duct gives rise to intermittent jaundice, following sharp pain in the right hypochondriac or epigastric region, frequently radiating toward the right scapula, nausea, vomiting, sweating, depression, and often intermittent fever (Charcot's intermittent fever). When the stone is impacted in the cystic duct, jaundice is less common, but the hepatic colic is severe, and dropsy of the gall-bladder may occur. The diagnostic points are the age, sex, history of previous attack, with jaundice and intermittent fever, location of the pain, dark, amber-colored urine, containing bile, and sometimes the finding of the stone in the feces.

Complications and sequels.—(1) Suppurative cholecystitis (empyema of the gall-bladder); (2) secondary abscesses; (3) permanent jaundice, with production of Chacot's intermittent fever; (4) ulceration and passage of stone into the intestine; (5) obstruction of the bowels from gall-stone; (6) stricture of the ducts and atrophy of the gall-bladder." *(Pocket Cyclopedia.)*

Surgical treatment. Cholecystotomy is done through an incision parallel to and 1½ inches below the costal margin over the gall-bladder. The liver is drawn up and the intestines packed away with gauze. If the gall-bladder is distended the fluid is removed by tapping it with a trocar and cannula. The opening is then enlarged, and the stones are removed with a scoop. The bile-ducts are examined along their whole course by a finger externally, and by a long probe internally. If the interior is fairly healthy, the opening is sutured with two layers of continuous sutures and the abdomen is closed. Usually it is necessary to drain the gall-bladder for a time, in which case the margins of the opening are stitched to the peritoneum and transversalis fascia of the abdominal wound. The fistula thus established soon closes if there is no obstruction to the passage of the bile into the intestine. If not, it must be closed by a plastic operation or cholecystenterostomy. *(Aids to Surgery.)*

7. "*In severe burns* the first indication is to relieve pain by the hypodermatic injection of morphine and to react from shock; no attempt should be made to dress the burn until reaction has been obtained. The clothing should be cut, and, if it sticks, should be soaked in sweet oil or salt solution and allowed to drop off. The dressing of one part should be completed before exposing an additional area. In extensive burns the patient may be immersed in a warm bath (100° to 105°). In cases in which there is much charred tissue, the patient may be anesthetized and the devitalized parts cut away. One of the best ways of dressing a large burn is by strips of sterilized rubber tissue about an inch broad, allowing a fourth inch between each strip, and placing over this sterile gauze which has been wrung out in warm, sterile, salt solution. The gauze is changed as often as it becomes saturated with discharges, and the rubber tissue allowed to remain in place, thus eliminating much of the pain and distress which is always an unpleasant feature in the dressing of these cases. Many other dressings for burns have been recommended. If a limb has been completely carbonized, amputation should be performed as soon as shock has subsided." (Stewart's *Surgery.)*

8. *Anthrax* is due to infection with the bacillus anthracis and is found among people who have to do with diseased cattle (butchers, graziers, people who work in wool or hides). It begins as a red pimple, and rapidly infiltrates and spreads. The lymphatics become involved; fever, malaise, vomiting, and even toxemia appear. *Treatment:* Free excision of the necrotic area, and application of actual cautery or pure phenol.

9. *Gastrotomy.* "A vertical incision through the upper

part of the left rectus is the best one, but it may be made parallel to the costal margin. The stomach is picked up, and two strong sutures are passed through the serous and muscular coats to hold it. The rest of the abdominal cavity is then protected by packing around with gauze. An incision is made in the long axis, and a finger inserted to explore. The wound is closed by two rows of continuous stitches, the first going through all the coats, the last through serous and muscular coats only." After the patient has reacted from shock, he should be placed in Fowler's position, so that any infective material may flow toward the pelvis. Continuous proctoclysis should be employed.

10. Raise the feet, lower the head, apply warmth, and use enteroclysis or hypodermoclysis.

11. ECTROPION. *Symptoms*: "Epiphora (from eversion of punctum) causing excoriations and eczema of the lower lid, which, in turn, through contraction, increase the deformity. The exposed conjunctiva becomes reddened and hypertrophied. In marked cases the cornea may suffer, as a result of imperfect closure of the lids."—(May's *Diseases of the Eye.*)

Operative treatment consists in: (1) Snellen's sutures; (2) reduction of the length of the border of the eyelid; (3) tarsorrhaphy; or (4) blepharoplasty.

12. COMPRESSION OF BRAIN. 1ST STAGE: Compensation. Symptoms are few. Headache, with mental dullness.

2ND STAGE: Venous stasis. Severe headache, with drowsiness or restlessness. Congestion of the vessels on the scalp and eyelids. The fundus oculi shows swelling and enlarged tortuous veins. The pulse is slow and the blood-pressure rises.

3RD STAGE: Cerebral anemia. Unconsciousness absolute. *Respirations* slow, labored, and stertorous. Cheeks puffed out. Soft palate paralyzed. Cheyne-Stokes breathing in bad cases. *Pulse* full, slow. Blood-pressure is high. *Temperature* generally raised. More on the paralyzed side than the other. *Pupils* unequal and fixed. Each first contracts, then dilates; first the one on side of lesion, then the opposite. Choked disc. *Motor paralysis*, generally hemiplegic. *Bladder* paralyzed, retention. *Rectum.*—Sphincter paralyzed. *Reflexes differ* on two sides generally. On paralyzed side they are increased.

4TH STAGE: Medullary paralysis. The respiration fails first, and then the pulse becomes rapid and weak. The pupils are widely dilated and fixed. The blood-pressure falls and death occurs. (Grove's *Synopsis of Surgery.*)

DIAGNOSIS.

1. *Acute pericarditis.* "In many cases, usually those sec-

ondary to some already existing disease, the onset is insidious, with an entire absence of subjective symptoms. In other, especially primary, cases there is precordial pain, discomfort, or distress, aggravated by pressure over the lower sternum. As effusion occurs, dyspnea, left-side decubitus, even orthopnea, become manifest. The face is cyanotic and anxious, the breathing is labored, often irregular, the pulse small and perhaps paradoxical. Aphonia, irritative cough, dysphagia, and distention of the veins of the neck may result from the. pressure of a large effusion There is fever, usually irregular, and varying from 101° to 103°. In the graver cases there may be constant restlessness and persistent insomnia, followed by delirium, stupor, and coma. After effusion has taken place there is precordial bulging in children, even with a moderate exudate; and in adults, if the effusion is copious, the anterior and lateral portions of the chest are enlarged, the intercostal spaces are prominent, the nipple is elevated, and there may be edema of the walls. The left lobe of the liver may be depressed by the weight of the fluid, and in consequence the epigastric region become distinctly prominent. The apex beat and the thrust of the heart become less and less palpable and may finally disappear as the effusion increases. Friction fremitus and friction sounds may persist at the base, rarely at the apex, and are most readily elicited when sitting upright, but are ordinarily not heard over the body of the heart in any but slight effusions. Percussion shows a much increased triangular area of dullness, within which a feeble apex beat is felt. Dullness in the fifth interspace to the right of the sternum is present even with slight effusions; and in large effusions there may be a limited area of slight or marked dullness in the left infrascapular region. The lung having been forced back and compressed, there may be dull tympany, with weak or bronchial breathing in the axilla to the left of the triangular area of dullness. The heart sounds at the apex are muffled, faint and distant; at the base the second sounds, especially the pulmonary, may be clear and accentuated. There may be a systolic endocardial murmur." —(Butler's *Diagnostics of Internal Medicine.*)

2. *Cerebrospinal meningitis.* It begins with a chill, vomiting or convulsion, and rise of temperature. The pulse is full and strong. There are hypersensitiveness to light, sound, and touch and excruciating pain in the head, back, and limbs. A petechial rash appears and sometimes herpes is present. Leucocytosis is the rule. The urine is scanty, high colored, and may be albuminous. If the meninges of the brain are most involved, delirium, stupor, semiconsciousness, paralysis of the ocular muscles, disturbed vision, and deafness may be present; if those of the cord

are most affected, there will be opisthotonos, hyperesthesia, paresthesia, rigidity and tremor of the extremities, localized spasms, and convulsions. *Kernig's sign.*—The patient should be propped up in bed in the sitting posture; then, on attempting to extend the leg on the thigh, there is contraction of the flexors, which prevents the full straightening of the leg. In the recumbent position the leg can be extended. *(Pocket Cyclopedia.)*

3. *Dilatation of stomach:* There is a sense of fullness in the epigastrium and the outlines of the organ may be detected by inspection, palpation, and percussion. The area of the stomach is shown to be below the navel. Anorexia, constipation, eructation of gas, copious vomiting, emaciation, and anemia are prominent symptoms.

4. *Atrophic cirrhosis of liver:* The onset is gradual with progressive loss of flesh and strength, gastrointestinal disturbances, constipation, disturbed sleep, and dyspnea. Obstruction to the portal circulation results from the contraction of the interstitial tissue and produces ascites, edema, hemorrhoids, hemorrhages from the stomach or bowels, and clay-colored stools. The abdominal veins, especially around the umbilicus, are enlarged and form the "caput medusæ." Jaundice is absent and the liver is reduced in size. Hemorrhages, exhaustion, and autointoxication appear as complications. *(Pocket Cyclopedia.)*

5. *Arteriosclerosis.* Increased tension in the pulse, causing a hardness, often feeling like "pipe-stems." Great hypertrophy of the cardiac muscle ensues. The coronary arteries may be involved, leading to fibroid degeneration, fatty degeneration, and the symptoms of angina pectoris, absence of compensation, dyspnea, scanty urine, and other symptoms. The cerebral arteries may be involved, and hence apoplexy is common. The kidneys may next suffer, giving rise to interstitial nephritis or contracted kidney. *(Pocket Cyclopedia.)*

6. *Acute articular rheumatism.* The onset of the affection is usually sudden although anorexia, sore throat, vague pains, etc., may precede. The inflammation first attacks the large joints, and may subside quickly in one joint to attack another. It is attended by high fever (103° to 104° F.), rapid pulse, and profuse acid sweats. The urine is scanty, high-colored, and contains an excess of uric acid and urates. Hyperpyrexia, organic heart-disease, pneumonia, pleurisy, cerebral symptoms, various cutaneous eruptions, and rheumatic nodules may occur as complications. *(Pocket Cyclopedia.)*

7. In pus formation and retention there may be raised body temperature, shivering, rigor, leucocytosis; and if sufficiently near the surface, fluctuation may be obtained. Pain and swelling may also be noticed.

8. ENLARGEMENT OF THE SPLEEN.—"Excessive chronic enlargement is most frequently due to leucemia, splenic anemia, or chronic malaria; lesser degrees may be met with in cirrhosis of the liver, rickets, pernicious anemia, passive congestion, or actual portal obstruction. Acute enlargement is most often encountered in septicemia, malarial fever, typhoid and typhus, erysipelas, acute miliary tuberculosis, tuberculous peritonitis, cerebrospinal meningitis, smallpox, diphtheria, scarlet fever, relapsing fever, infarct, plague, and certain other tropical diseases."—(Greene's *"Medical Diagnosis."*)

An enlarged spleen is diagnosed by palpation. "The position of the patient should be right lateral if minor enlargements are to be noted, as in typhoid fever or other acute infections, and the right hand should make pressure posteriorly while the left makes palpation. Abdominal distention defeats palpation save in great enlargement and the normal spleen is not palpable. If greatly enlarged the dorsal position is to be preferred and the condition can hardly be overlooked, unless with a tense wall the careless or hurried examiner fails to get below the actual border or to distinguish between muscular resistance on the one side and the splenic mass on the other. In these cases the chief notch in the anterior border is sharply defined and quite distinctive. In all cases where doubt arises as to the nature of a large tumor in the splenic area it should be remembered that a splenic growth or tumor is superficial, that its dullness is marked and can be carried directly back to its normal area behind the ninth, tenth, and eleventh ribs, that it ordinarily moves directly with respiration, and that if the colon be inflated splenic tumor dullness is not impaired. On the contrary, large renal tumors extend more deeply, are relatively fixed or immovable, are likely to be reniform or nodular, and are crossed by an area of resonance if the colon be distended with air. As in the case of the liver, a downward displacement of the diaphragm may produce an apparent increase in the lower splenic area just as an emphysematous lung or a pneumothorax may cause an apparent diminution in its upper percussion area."—(Greene's *Medical Diagnosis.*)

9. In *typhoid:* Widal reaction may be obtained; red cells are moderately decreased, there is slight diminution of hemoglobin; no leucocytosis as a rule, and generally a hypoleucocytosis.

In *malarial fever:* The plasmodium malariæ will be found; red cells and hemoglobin are diminished.

In *trichinosis:* Large increase in the number of eosinophiles, and decrease in number of polynuclears; the trichinella embryos may be found.

10. *Herpes Zoster* is an acute inflammatory disease (of the nerves), but affects the skin. It is characterized by the formation of grouped vesicles along the line of a cutaneous nerve, and accompanied by neuralgic pains. It is usually associated with some neurotic disturbance, and is caused by atmospheric changes, exposure to cold and wet, traumatism to the nerves, and the long-continued use of arsenic. The disease is self-limited, most frequently unilateral, and seldom recurs.

11. In *bronchial asthma* there is a paroxysmal expiratory effort, of sudden onset, and followed by the expectoration of characteristic sputum (containing Laennec's perles, Curschmann's spirals, and eosinophiles); sibilant and sonorous râles are present.

In *cardiac asthma* the dyspnea is not accompanied by dry sonorous râles and the other physical signs of bronchial asthma; but moist crepitations may be heard.

12. ASCITES. *Causes:* Nephritis, atrophic cirrhosis and other disease of liver, heart disease, peritonitis, tuberculosis, abdominal tumors. The condition is recognized by enlargement of the abdomen, most marked in the flanks when the patient is lying on his back; the skin is tense and shiny with dilated superficial veins on the surface. Prominence of the umbilicus. Fluctuation, and vibration on palpation. Percussion yields a dull note, which alters on the patient assuming a new position of the body. When the patient lies on the back, the dullness on percussion is most marked in *the flanks and hypogastrium;* while the note is *resonant* at the umbilicus. Turn the patient on the side, the fluid moves to the most dependent part, and consequently a resonant note may be obtained in the *opposite* flank.

PATHOLOGY AND BACTERIOLOGY.

1. "In *fibrinous pleurisy* there is soon an exudate of fibrin forming a thin yellowish layer on the surface. It may increase in thickness and cause the pleural surfaces to adhere slightly, giving rise to the so-called "bread and butter" pleurisy. This exudate is composed of flakes and masses of fibrin containing leukocytes. The endothelium below is thickened and in places has desquamated. The sub-endothelial connective tissue is infiltrated by round cells and the vessels are congested. The exudate may be absorbed completely, but if there has been much fibrin formation adhesions of varying density result. New capillaries penetrate the fibrin masses, the fibroblastic cells proliferate, and organization takes place. These bands, although at first delicate, soon become very dense. They may be so extensive as to cause almost complete obliteration of the pleural cavity, or be present in scattered areas

only. There may be areas on the surface of the pleura of marked chronic thickening.

Serofibrinous pleuritis. In this variety there is a large amount of serous exudate as well as fibrinous. It may follow the fibrinous form, but usually begins with a serous outpouring. The fluid is denser than that in hydrothorax, and contains bits of fibrin as well as red and white blood-cells in small numbers. The amount of fluid may be very little or as much as several liters. The exudate may become somewhat hemorrhagic if large numbers of erythrocytes are present. The lung is pushed backward and the neighboring organs pressed upon.

Empyema or purulent pleuritis is the result of infection by some one of many micro-organisms. It may begin as a purulent pleurisy or it may follow infection of a serofibrinous pleuritis. It may result from some traumatism causing an opening into the pleural sac or occur in the course of disease of the lung. In the adult its cause is most frequently the streptococcus, in children the pneumococcus. Tuberculous infection in adults is nearly twice as frequent as in children. The infecting organism, whatever it is, can be carried to the pleura either by means of the lymphatics or the blood-vessels. The organisms most commonly found are the streptococcus, pneumococcus, tubercle bacillus, staphylococcus. In the pleural cavity there is found a small or a large amount of a cloudy purulent fluid which contains great numbers of pus-cells. The color may be at times greenish, although usually yellowish. The pleuræ are generally thickened and congested and covered with flakes of fibrin and degenerated endothelium. The pus may be completely absorbed and the two inflamed pleuræ unite with dense adhesions, or it may become cheesy and undergo calcareous infiltration. The changes are most marked in the visceral pleura. which becomes greatly thickened, and at first is soft and edematous, while fluid is still present. When the exudation disappears it becomes very hard and callous." (McConnell's *Pathology.)*

2. *In acute hyperplastic splenitis* there will be found, on microscopical examination, "a pulp distended with blood, an enormous number of leucocytes, and red cells, many of the latter fragmented. If bacteria are circulating in the blood the splenic interstices may be distended by the invaders. The pulp cells may be found in all stages of their life history—karyokinetic, active, cloudy, granular, and fragmenting; the displaced and softened fibrous network manifests the separation of fibers incident to edema and vascular distention. Commonly, the splenic pulp contains a large number of phagocytes in which may be found bacteria. Some of the phagocytic cells are leucocytes, others are derived from the large endothelial cells lining the pulp

sinuses; many of the phagocytes contain erythrocytes. Areas of focal necrosis are practically always present, and in some of these fibrin may be demonstrated."—(Coplin's *Pathology.*)

3. "*Catarrhal enteritis* may affect any part of the intestinal tract. The mucosa is swollen and usually light-red in color; the arteries are visibly distended, and not rarely there are petechial hemorrhages. The surface is covered with mucous exudate containing desquamated and degenerated epithelial cells and emigrated leucocytes; while the intestinal contents are rendered liquid by serous exudation. The solitary follicles or agminated collections of lymphoid tissue may be particularly swollen and cause projections above the surrounding mucosa. The term *follicular enteritis* is applied to such cases. In other instances the desquamation of epithelium is more prominent than the mucous exudation, and considerable shreds of mucosa may be loosened and discharged. The term *croupous enteritis* is suggested by such conditions." (Stengel's *Pathology.)*

4. In carcinoma "metastasis, as a rule, follows the lymphatic channels, and thus primarily involves the lymphatic glands in the neighborhood of the growth. The process may be explained as follows: Some of the epithelial cells in their advancing proliferation penetrate the lymphatic channels and are carried in the lymph stream to the nearest lymphatic gland, where they again proliferate and form secondary nodules; from these a similar extension occurs, and eventually widespread metastasis results."—(Stengel's *Pathology.*)

5. *The estivoautumnal parasite.* "This parasite appears at first as a small, hyaline body, smaller than that of the tertian parasite, then as a pigmented body, and later as a segmenting body. Crescentic, ovoid, and flagellate bodies also appear later. When fully grown the parasite does not occupy more than one-third the red corpuscle, but it is remarkably active. The pigment is small in quantity, finely granular and it assumes an annular form more frequently than in other forms. The period of development occupies forty to eighty hours, but only the early stages can be seen in the blood drawn from the peripheral circulation, as small, hyaline bodies. The other stages are passed through in the spleen, liver, bone-marrow and cerebral capillaries. The merozoites, seven to twelve in number, rarely more, are arranged in spoke fashion. The corpuscles containing them become shrunken, crenated and brassy in color. Laveran's sickles, or crescents, are seen more often in this than in other forms, at the end of a week. They are the gametes, sexual forms, that do not undergo

sporulation. Large round bodies of the same nature, containing a central pigment clump, are also seen.

The plasmodium is a motile, protozoan parasite belonging to the hemosporidia. So far as it has been possible to determine, the parasite exists only in man and the mosquito, passing in each a different stage or cycle of its existence. *The parasite in man* remains asexual until it has passed through several evolutions, finally entering a sexual state, but it remains sterile until it reaches the body of the mosquito." (French's *Practice of Medicine.)*

6. The treponema pallidum is probably the exciting agent in syphilis.

A gumma is a mass of granulation tissue, grayish-yellow in color, containing many cells and few fibers. Organization of the gumma fails to take place because of a want of sufficient blood-supply, the cellular mass is apt to undergo caseation, and when this occurs an ulcer forms. One portion of the mass may caseate, another portion may become fibrous. In some cases the entire gumma becomes fibrous. A gumma varies in diameter from one-eighth of an inch to two or three inches, presents a center of gummy degeneration, a surrounding area of immature fibrous tissue, and an outer zone of embryonic tissue and leucocytes. A gumma, when it is spontaneously evacuated, exhibits a small opening or many openings with very thin red and undermined edges; the ulcer is slow to heal and forms a thin scar, white in the center but pigmented at the margins and usually depressed." (Da Costa's *Surgery.)*

7. To demonstrate the existence of *tubercle bacilli* in the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken that it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue. The tubercle bacillus is rod shaped, is from 1½ to 3½ mikrons in length, and about one-third to one-half a mikron in breadth, is a strict parasite, is not motile, and has no flagella. It is slightly curved, does not form spores, is not liquefying, and nonchromogenic, is aerobic; it resists acids; it grows well on blood serum; stains well by Ehrlich's, Ziehl-Nielsen's, or Gabbett's method; it is Gram-positive. Tuberculin tests may also be tried, *Cal-*

mette's ophthalmo-reaction, by which one drop of a one per cent. solution of old tuberculin is dropped into the eye. In from twelve to twenty-four hours a positive reaction is shown by the conjunctiva becoming hyperemic. It is uncertain and unsafe. *Von Pirquet's test* and the *Moro reaction* are also used.

8. *Pathogenic bacteria* are such as (under certain circumstances) may produce disease.

"As to the mechanism which bacteria make use of in order to produce disease, according to our present knowledge, they work chiefly through the poisonous substances formed by them and deposited in the bodies of the persons suffering from the disease. The theory that bacteria have an important influence through the destruction of substances taken by them from the body of the patient for food is no longer entitled to much weight; neither are we able in most cases to account for the phenomena of disease by any mechanical action on the part of the bodies of bacteria. That such action does occasionally take place may be seen in experimental anthrax in mice, where the blood capillaries of the liver and kidneys may be completely plugged with masses of anthrax bacilli. The diseases in which the circulating blood is swarming with bacteria are much commoner in the lower animals than in man."—(Williams' *Bacteriology*.)

Cultivation on artificial media does affect the virulence of pathogenic bacteria. Thus *pneumococci* which have been kept upon artificial media are less virulent than *pneumococci* freshly isolated from the bodies of man or animals.

9. *Gram's method of staining:* Stain a cover glass preparation for two or three minutes in anilin gentian-violet. Wash in water. Treat with Gram's solution (iodine, 1 gram; potassium iodide, 2 grams; water, 300 c.c.) for a minute and a half, when the preparation becomes nearly black. Decolorize with strong or absolute alcohol for at least five minutes, wash, dry, and mount. Sometimes a contrast stain of Bismarck brown or eosin is used.

The *diplococcus of pneumonia* is stained by Gram's method; and the *micrococcus catarrhalis* is not stained by Gram's method.

10. *Bacillus pestis* is non-motile, with rounded ends, is about 1½ mikrons in length and a little more than half a mikron in breadth; it stains readily with all the anilin dyes, but not by Gram's method; it has no spores, is not encapsulated, non-flagellated, non-chromogenic, aërobic and optionally anaërobic, and is the specific pathogenic organism for bubonic plague.

"When cultures are made from the blood of softened

contents of the buboes the bacillus may be obtained in pure culture."

11. Three pathogenic anaërobic bacteria that may be conveyed from the soil: Bacillus of tetanus, bacillus of malignant edema, and bacillus of symptomatic anthrax (black leg).

12. *Disinfection* is the process of destroying or removing pathogenic microorganisms.

A method of determining the strength of a fluid disinfectant: "To a measured quantity of a virulent bouillon culture of the test organism is added a given amount of the germicide. After varying lengths of time inoculations are made from this mixture into culture media, preferably bouillon, and note is made of the presence or absence of growth under suitable conditions of temperature and the like. The shortest exposure to the weakest solution of the substance necessary to kill the test organism is taken as the germicidal value of that substance for the particular organism used."—(Williams' *Bacteriology.*)

STATE BOARD EXAMINATION QUESTIONS.

North Carolina Board of Medical Examiners.

ANATOMY AND HISTOLOGY.

1. Name the bones of the foot, and describe the inferior extremity of the tibia.
2. Name and describe the salivary glands.
3. Locate and describe the gall-bladder.
4. (*a*) With what bones does the radius articulate? (*b*) Name the ligaments of wrist-joint.
5. Give origin, insertion, function and nerve supply of the following muscles: Sartorius, sternocleidomastoid and the sphincter ani externus.
6. What constitutes the brachial plexus? and describe the musculospiral nerve.
7. (*a*) Name arteries which supply the heart with blood and where they originate; (*b*) name branches of subclavian artery.
8. (*a*) Name the abdominal viscera wholly covered with peritoneum; (*b*) those partially covered.
9. Describe the broad ligaments of the uterus and their anatomic relations.
10. Describe the structure of the prostate gland and give its anatomic relations.
11. Describe the medulla oblongata.
12. Describe the portal system.

PHYSIOLOGY AND HYGIENE.

1. Enumerate the changes, degenerative and regenera-

tive, that take place in a neuron whose nerve fiber has been severed from its cell.

2. Define metabolism, and mention the manifestations of cell life.

3. Discuss the hydrochloric acid of the gastric juice—(*a*) its functions, (*b*) the probable histological elements concerned in its secretion, (*c*) its origin, or probable nature of the chemical reaction or reactions by which it is produced.

4. What facts are suggested by clinical observation and animal experimentation as to the importance to health of the thyroids and parathyroids?

5. Discuss the phenomena of heart action—(*a*) as to the cause or causes of its beat, (*b*) as to the probable nature of its *inner stimulus* to automatic rhythmical contractions, (*c*) as to the control of the rate and force of its beat.

6. What means of defence is afforded by the constituents of the blood against invasion of the organism by pathogenic germs?

7. What is uric acid, what its properties, and what its origin?

8. Define and state the significance or use, as the case may be, of (*a*) indican, (*b*) creatin, (*c*) glycogen, (*d*) collagen, (*e*) lipase.

9. Define or describe diffusion, dialysis, and osmosis, and suggest certain physiological phenomena due more or less to these processes.

10. Of what food value are commercial meat extracts?

11. Suggest the prophylaxis of gastroenteric toxemias of bottle-fed infants.

12. Point out the measures necessary to prevent the fever.

CHEMISTRY.

of scarlet fever, a case of diphtheria, a case of yellow spread of infection from a case of typhoid fever, a case

1. Define (*a*) chemical affinity; (*b*) the difference between an atom and a molecule; (*c*) an element and a compound.

2. Give the chemical names of the following formulæ: (1) HCl; (2) H_2SO_4; (3) HNO_3; (4) H_2O; (5) H_2O_2; (6) $AgNO_3$; (7) NH_3; (8) HgCl; (9) $HgCl_2$; (10) Na_2SO_4; (11) NaCl; (12) HgO.

3. Describe hydrogen, giving symbol, atomic weight, chemical properties, and express by a chemical equation the reaction which takes place when zinc is acted upon by hydrochloric acid, hydrogen being liberated.

4. Name the chief four elements which enter into the formation of organic compounds.

5. Describe in detail (*a*) the "coagulation by heat" test

for albumin in the urine, (*b*) the "nitric acid" test, (*c*) Fehling's test for sugar, (*d*) Boetger's bismuth test for sugar.

DISEASES OF CHILDREN.

1. Describe symptoms and sequelæ of acute atrophic (infantile) paralysis, and designate location of the pathological lesion.
2. Describe treatment (with prescription) of a case of acute gastroenteritis, child two years of age.
3. Treat a case of acute catarrhal croup in a child of three years (with prescription).
4. Give differential diagnosis between measles and scarlet fever.
5. Give the dose of the following drugs for an infant three months old: Tinct. aconite, phenacetin, tinct. opii camphorata, quinine, syrup of ipecac, ammonium chloride, spiritus etheris nitrosi, comp. spts. of ether, sodium bromide.

MATERIA MEDICA AND THERAPEUTICS.

1. What is meant by an official drug?
2. Define a fluid extract, a spirit, an infusion, a decoction.
3. Select four of the following drugs and give their official, botanical and common names, the parts used, their chief official preparations and alkaloids (official alkaloids only), and state very briefly their physiological actions and therapeutic indications—aconite, belladonna, digitalis, ergot, nux vomica, opium. (Answers should not exceed one page of written matter to the drug.)
4. Give the dose of apomorphinæ hydrochloridum, hydrargyri iodidum flavum, cocaina, phosphorus, pilocarpinæ hydrochloridum, resina podophylli, santoninum, tinctura aconiti, tinctura gelsemii.
5. Give official names (Latin or English) of Basham's mixture, carron oil (chief use), Dover's powder (amount of each ingredient), Gray powder, Hoffman's anodyne, Lugol's solution, Monsel's solution, spirit of Mindererus, tartar emetic, Donovan's solution.
6. How would you treat a case of poisoning when the toxic agent was unknown?
7. Name four drugs that are specifics, and the diseases they will cure.
8. State what remedies you would use to relieve pain; give indication and contraindications of each.
9. State what drugs you would use to produce sleep; give indications and contraindications of each.
10. Write a prescription for each of the common complications of typhoid fever.

PRACTICE OF MEDICINE.

1. Differentiate between vesicular and bronchial breathing. What does bronchial breathing denote?
2. What is meant by cardiac compensation? Give symptoms of ruptured or broken compensation.
3. Give differential diagnosis between peptic ulcer and gastralgia.
4. What approximately is the normal amount of urine in twenty-four hours and specific gravity? How affected by acute nephritis, chronic interstitial nephritis, chronic parenchymatous nephritis, diabetes mellitus?
5. In unilateral facial paralysis how would you differentiate a central from a peripheral origin? Give causes. In which does reaction of degeneration follow?
6. Differentiate between follicular tonsillitis and diphtheria.
7. Give etiology and symptoms of arteriosclerosis and state what conditions of heart, brain and kidney are produced by it.
8. Give symptoms of acute intestinal obstruction.
9. Give leading symptoms in leukemia (splenomedullary) and the blood picture.
10. Write one prescription in pill form for anemia, using three or four drugs.

OBSTETRICS AND GYNECOLOGY.

1. Define version. Give the indications and dangers of version.
2. Describe the changes in position the uterus undergoes during pregnancy.
3. Into what stages is labor divided. Give a description of each stage.
4. What are the dangers of ergot in obstetrics? And when should it be given?
5. Define and classify ectopic pregnancy. What are the symptoms of rupture of an ectopic pregnancy? Give the treatment.
6. Give the physical signs of an acute peritonitis.
7. What are the symptoms of cancer of the uterus?
8. What are the relative advantages and disadvantages of the abdominal and vaginal routes in pelvic surgery?

SURGERY.

1. (*a*) What is pyothorax? (*b*) What particular infection is its most frequent cause, and (*c*) what is its treatment? (*d*) If operation, describe it.
2. (*a*) Discuss ascites, and (*b*) give some of the causes and treatment for same.
3. Describe operation for internal strabismus.

4. Describe amputation of lower leg one inch below tubercle of tibia.

5. (*a*) Define hemorrhoids, (*b*) discuss their palliative treatment, and (*c*) describe the ligature operation.

6. Describe operation for resection of six inches of middle of ileum. (This includes preparation of abdomen.)

7. Discuss shock and its treatment. Differentiate between symptoms of shock and hemorrhage.

8. (*a*) Give prominent symptoms of carcinoma of the cervix uteri, (*b*) discuss its treatment (if operative, do not describe operation, simply name it), and (*c*) give the most frequent predisposing cause.

9. What are the causes, symptoms and treatment of intestinal perforation?

10. Discuss briefly the uses of the Röntgen ray in surgery and in the treatment of superficial epithelioma.

11. Mention two kinds of suture material and describe the preparation of each for surgical use.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

North Carolina Board of Medical Examiners.

ANATOMY AND HISTOLOGY.

1. *Bones of foot:* Os calcis, astragalus, cuboid, scaphoid, internal cuneiform, middle cuneiform, external cuneiform, five metatarsals, and fourteen phalanges.

The inferior extremity of the tibia is quadrilateral, is smaller than the superior extremity, is grooved behind for the tendon of the flexor longus pollicis, has a rough articular surface externally for the fibula. Internally it presents the internal malleolus, which projects downward and articulates with the astragalus. The inner surface is smooth; the posterior border is grooved for the tendons of the tibialis posticus and flexor longus digitorum; the internal lateral ligament is attached to the tip.

2. Parotid, submaxillary, and sublingual glands.

"The *parotid gland*, so called from its location near the ear, is the largest, weighing from a half to one ounce. It occupies the space in front of the ear, bounded below by the angle of the jaw, and a line extended from it to the mastoid process, above by the zygoma, in front by the masseter muscle, and behind by the mastoid process, the external meatus, and the digastric muscle. The external carotid artery, the temporo-maxillary vein, the facial nerve, and the great auricular nerve pass through it.

The *duct* of the *parotid gland*, Steno's or Stenson's duct, empties its secretion into the mouth. It is about two and a half inches in length, of the diameter of a crow's quill,

and crosses the face upon the masseter muscle, through the substance of the buccinator muscle, in the direction of an imaginary line drawn about a finger's breadth below the zygoma, from the lower part of the ear to midway between the ala of the nose and the margin of the upper lip, to open about the position of the second molar tooth of the upper jaw.

"The *submaxillary gland* occupies the submaxillary fossa on the inferior surface of the inferior maxilla, within the submaxillary triangle of the neck. The facial artery grooves its upper and posterior border, and it is separated behind from the parotid gland by the stylo-maxillary ligament. The duct of the submaxillary gland, or Wharton's duct, about two inches in length, passes forward between the hyoglossus, geniohyoglossus, and mylohyoid muscles, to open at the side of the frænum linguæ.

"The *sublingual gland,* the smallest, lies on the floor of the mouth, at the side of the frænum linguæ, beneath the mucous membrane. Its ducts, called the ducts of Rivini, from eight to twenty, open on the mucous membrane. One of them, the longest, called the duct of Bartholin, joins Wharton's duct." (Young's *Anatomy.)*

3. The *gall bladder* is a conical bag placed in a fossa on the under surface of the right lobe of the liver. Its upper surface is attached to the liver, and its fundus and posterior surfaces are invested by peritoneum reflected from the adjacent surface of the liver. The body is in relation in front with the liver, and behind with the first part of duodenum, the pylorus, and the hepatic flexure of colon. The fundus is in contact with the parietes opposite the ninth right costal cartilage.

4. (*a*) *The radius articulates with:* Humerus, ulna, scaphoid, and semilunar.

(*b*) *Ligaments of wrist joint:* Anterior, posterior, external lateral, and internal lateral.

5. SARTORIUS. *Origin:* Anterior superior spine of ilium, and part of notch below. *Insertion:* Inner side of tibia near tubercle. *Function:* Flexes and crosses legs. *Nerve supply:* Middle cutaneous, or branch from anterior crural.

STERNO-CLEIDO-MASTOID. *Origin:* Upper end of sternum and upper and inner end of clavicle. *Insertion:* Mastoid process of temporal bone and outer half of superior curved line of occipital bone. *Function:* Flexes head on neck and rotates the head. *Nerve supply:* Spinal accessory and cervical plexus.

SPHINCTER ANI EXTERNUS. *Origin:* Tip of coccyx. *Insertion:* Central tendinous raphe of perineum. *Function:* To keep the anal orifice closed. *Nerve supply:* Fourth sacral and internal pudic.

6. The *brachial plexus* is formed by the union and subse-

quent division of the anterior divisions of the fifth, sixth, seventh, and eighth cervical and the first dorsal nerves. The union of the fifth and sixth makes the upper trunk; the seventh forms the middle trunk, and the eighth cervical and first dorsal make the lower trunk. Each of these trunks is divided into an anterior and a posterior branch. The anterior branches, from the upper and middle trunks, make the upper or outer cord of the plexus; the anterior branch of the lower trunk becomes the lower or inner cord; the three posterior branches unite to form the posterior or middle cord. The plexus lies between the Scalenus anticus and medius.

The *musculospiral nerve* is derived from the posterior cord of the brachial plexus, and originates from the sixth, seventh, and eighth cranial nerves. At first it is behind the axillary and brachial arteries; it winds around the humerus in the musculospiral groove with the superior profunda artery; it pierces the triceps muscle. At the elbow joint it divides into the radial and posterior interosseous nerves. It supplies the triceps, anconeus, supinator longus, brachialis anticus and extensor carpi radialis longior muscles.

7. (*a*) The right and left coronary arteries from the aorta. (*b*) Vertebral, thyroid axis, internal mammary, and superior intercostal arteries.

8. (*a*) *Viscera wholly covered with peritoneum:* Liver, stomach, spleen, jejunum, ileum, transverse colon, sigmoid flexure, upper part of rectum, uterus, and ovaries.

(*b*) *Viscera partially covered with peritoneum:* Duodenum, ascending and descending colon, middle part of rectum, and bladder.

9. The *broad ligaments* are formed of a double layer of peritoneum passing from the surfaces of the uterus to the sides of the pelvis. Between the two layers of this ligament on each side are the Fallopian tube, the round ligament, the parovarium, the ovary and its ligament, uterine and ovarian vessels, nerves and lymphatics.

10. *Structure of prostate.* "The prostate is a compound tubulo-alveolar gland whose ducts open into the prostatic portion of the urethra. Smooth muscle fibers not only surround the organ, but interlace radially toward its center, forming a network in whose meshes the glandular parts are located. Areolar tissue and blood-vessels accompany the muscle tissue. The alveoli of the glands are lined by simple columnar epithelium, which sometimes show two rows of nuclei. These alveoli contain a serous acid coaguum and usually oval laminated concretions called *prostatic bodies.* The latter are more numerous in old men. The numerous excretory ducts unite to form twelve to fifteen collecting tubes whihch open into the urethra,

most of them into the *prostatic sinus*. These ducts are lined by simple columnar epithelium, except near their terminations where it is transitional. The organ dorsal or in front of the urethra is mostly smooth muscle tissue." (Hill's *Histology.)*

RELATIONS OF PROSTATE. *Anteriorly:* Symphysis pubis, anterior ligaments of bladder, branches of dorsal vein of penis. *Posteriorly:* Rectum. *Laterally:* Levator ani. *Base:* Surrounds neck of bladder, seminal vesicles, and vasa deferentia. The *apex* rests on triangular ligament.

11. The *medulla oblongata* is the lowest part of the encephalon, and is continuous below with the spinal cord. It extends from the lower margin of the pons to the lower margin of the foramen magnum. It lies in the basilar groove of the occipital bone; its dorsal surface is between the cerebellar hemisphere. It forms the lower part of the floor of the fourth ventricle. It is about one inch long, half inch wide, and half inch thick. It has anterior and posterior median fissures, which are continuous with those of the spinal cord.

12. *Portal system.* "The veins of the portal system collect the blood from the digestive tract. They form a trunk, the *vena portæ,* which enters the liver and breaks up into small branches in its substance. The following veins form the portal system:

Inferior mesenteric; drains rectum, sigmoid flexure, and descending colon. It lies to the left of its artery, and passing behind transverse part of the duodenum and the pancreas, and over left kidney, opens into the splenic vein.

Superior mesenteric. Drains small intestines, cecum, ascending and descending colon. It passes upward in front and to right of superior mesenteric artery, in front of transverse part of duodenum, and behind neck of pancreas joins the splenic vein at the upper border of the pancreas to form the portal vein.

Splenic. Commences in five or six branches in hilum of spleen; these unite to form a trunk which passes below splenic artery behind upper border of pancreas from left to right, and in front of aorta joins superior mesenteric at a right angle.

The gastric or coronary. A large vein acompanying coronary artery from right to left along lesser curvature of stomach to cardia, where it reaches esophageal tributaries, and, passing to right behind lesser sac, opens into the vena portæ. *(Aids to Anatomy.)*

PHYSIOLOGY AND HYGIENE.

1. A nerve fiber cut off from the cell from which it comes undergoes degeneration along the whole peripheral cut end at one and the same time. The changes are as

follows: (1) The axon dies and withers away; (2) the medullary sheath breaks up into fine fatty drops; (3) the nuclei under the neurilemma proliferate. This change also takes place in the proximal portion of the nerves up to the nearest node of Ranvier. The cell from which the axon comes shows a degeneration which is as follows: (1) Nissl granules become few and smaller, and eventually disappear entirely; (2) the whole cell eventually degenerates and dies, and therefore the whole proximal portion of the nerve fibers now shows Wallerian degeneration. If after section the cut ends be sutured together the axons in the central end will in time grow down the degenerated peripheral end to the parts originally supplied by the cut nerve.

2. *Metabolism* is the entire series of changes that occur in a cell or organism during the processes of nutrition. It is of two kinds: (1) Assimilative or constructive (anabolism), and (2) destructive (katabolism).

The *manifestations of cell life* are: Movement, ingestion, assimilation, excretion, growth, irritability, and reproduction.

3. HYDROCHLORIC ACID. (*a*) *Functions:* (1) To aid in digestion of proteids; (2) protective influence in destroying pathogenic bacteria. (*b*) It is produced by the oxyntic or parietal cells in the mucous coat of the stomach. (*c*) (1) $NaH_2PO_4 + NaCl = Na_2HPO_4 + HCl$; or (2) $2Na_2HPO_4 + 3CaCl_2 = 3Ca_3(PO_4)_2 + 4NaCl + 2HCl$.

4. The *function of the thyroid* is not definitely settled; (1) it has some trophic function, regulating oxidation in the body, and it is supposed to have also a special influence on the vasomotor nerves, the skin, the bones, and on the sexual functions; (2) it is supposed to antagonize toxic substances, and (3) it produces an internal secretion.

Removal of the thyroid gland causes mental and bodily dullness and apathy, tremors, twitchings, overgrowth of the connective tissues, and development of fat; the hairs fall out and the patient becomes unwieldy and clumsy in both body and mind. The complete removal causes death in most animals, and it is not considered justifiable in man. It has been claimed that the parathyroids can to some extent perform the function of the thyroids after extirpation of the latter.

5. (*a*) The cause of the heart beat is unknown. There are two theories: (1) That it originates in the nerve ganglia in the heart (neurogenic theory); (2) that it originates in the muscle cells of the heart (myogenic theory). (*b*) The probable nature of the inner stimulus to automatic rhythmical contractions is *nervous*. (*c*) The control of the rate and force of the heart beat is by: (1)

The sympathetic nerve, which quickens it; (*a*) the pneumogastric nerve, which inhibits or slows it.

6. The white corpuscles, by their phagocytic action; the plasma, by its alkalinity; and the agglutinating action of the blood all serve as a means of defence against bacterial invasion.

7. Uric acid is a dibasic acid, with the formula $C_5H_4N_4O_3$. It occurs chiefly in the urine, as urates of sodium and ammonium. It crystallizes as lozenge-shaped plates or prisms, arranged in bundles; it is without odor or taste, is slightly soluble in water, and is insoluble in alcohol or ether. In man it has a twofold origin, one portion coming from the breaking down of the nuclein containing tissues or cell elements of the body, and the other from the purin compounds in the food.

8. (*a*) *Indican* is indoxyl potassium sulphate; it is found (in excess) in the urine in hypochlorhydria; in hyperchlorhydria of gastric ulcer; in conditions in which there is diminished peristalsis of the small intestines, as in ileus and peritonitis, not in simple constipation; also in conditions in which putrefactive changes occur in the body elsewhere than in the intestine, as in empyema, putrid bronchitis, gangrene of the lungs, etc.—(From Witthaus' *Essentials of Chemistry.*)

(*b*) *Creatin* is a complex amido acid; it is found in muscle tissue, brain, urine, etc.; very little is formed in the body, and it is excreted in the urine as creatinin.

(*c*) *Glycogen* is animal starch, found chiefly in the liver and muscles. It is converted into sugar as it is needed in the body.

(*d*) *Collagen* is a constituent of connective tissues, cartilage, and bone; gelatin can be obtained from it.

(*e*) *Lipase* is an enzyme whose function is to split fats; it is found in the pancreatic juice.

9. "The term *diffusion* has long been applied to the regular mixing of the molecules of two gases when brought into contact in a confined space. More recently it has been applied to the mixing of the molecules of two solutions when brought into contact. If, however, the two solutions are separated by a membrane, permeable to the solutions, diffusion will still occur. To this form of diffusion the term *Osmosis* has been applied in the case of water, and *Dialysis* in the case of diffusible substances. All bodies can be divided into two groups, *crystalloids* and *colloids*. To the former group belong bodies having a crystalline form, which readily go into solution in water. All such bodies are diffusible (dialyzable), their power of dialysis, however, varying considerably. To the second group belong such bodies as have no crystalline form (amorphous). These are generally bodies with a large

molecule, which form colloidal suspensions in water, and are only slightly or not at all diffusible. An exception to this second group is hemoglobin, which has a very large molecule but is crystalline and is diffusible."—(Kirkes' *Physiology.*)

Physiological applications: "In the animal body the fluids are separated by delicate membranes across which the constituents of the fluids, inorganic and organic, are continually passing. Thus prepared foods in the intestine pass across the intestinal wall into the blood- and lymph-vessels; the constituents of the blood pass across the wall of the capillary vessel into the tissue spaces, from which they pass (*a*) through the walls of various glands to take part in the formation of their secretion; (*b*) across the sarcolemma into the interior of the muscle fiber; (*c*) across the limiting surface of and into the interior of all tissue cells. The waste products, the results of tissue and food metabolism, pass from the interior of cells across their limiting membranes or surfaces into the tissue spaces; thence across the wall of the capillary vessel and the epithelium of the lung, the kidney, the liver, etc., to take part in the formation of the excretions. These and other processes are believed to be accomplished by the factors, diffusion, osmosis, and filtration."—(Brubaker's *Physiology.*)

10. The food value of commercial meat extracts is very slight; they have a feeble stimulant action, and serve to flavor the water with which they are mixed.

11. Absolute cleanliness of bottles and nipples, together with the best milk that can be obtained. The whole matter of feeding to be attended to by some responsible person, and not to be left to a mere hireling.

12. *Diphtheria* is transmitted by contact with those already infected, by fomites, by careless disposal of secretions, by coughing or sneezing whereby the bacilli are carried through the air to the nose or mouth of others.

Diphtheria is conveyed through the air, or by the mouth, and occasionally through wounds. *Hygienic precautions* should include isolation of the patient, strict antiseptic precautions on behalf of all who come in contact with the patient, and fumigation with sulphur or formaldehyde.

Yellow fever is transmitted through the bite of an infected mosquito *(Stegomyia fasciata.)* Individuals should use mosquito netting round their beds and wire gauze in doors and windows, so as to keep out the mosquitos as much as possible. All pools, stagnant water, etc., where mosquitoes may breed, should be removed. All mosquitoes, larvæ, etc., should be destroyed as far as possible. By staying indoors during dusk and darkness, op-

portunities for infection may be avoided. Occasional fumigation with formaldehyde or sulphur is also efficacious.

Typhoid fever is transmitted through the food and drink becoming contaminated; flies may aid in this contamination. Boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put *in* water or other drink or food; flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physicians, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over.

Scarlet fever is transmitted by contact, and by the desquamation. Thorough quarantine and isolation are necessary.

CHEMISTRY.

1. (*a*) *Chemical affinity* is that force which attracts atoms to each other and causes them to unite to form a molecule. (*b*) An *atom* is the smallest portion of an element which can enter into chemical reaction. A *molecule* is the smallest portion of a substance (element or compound) which can exist free. (*c*) An *element* is a substance out of which we cannot, by any known means, get dissimilar substances. A *compound* is a substance made up of two or more elements, chemically united, in definite proportions.

2. HCl is hydrochloric acid; H_2SO_4 is sulphuric acid; HNO_3 is nitric acid; H_2O is hydrogen monoxide; H_2O_2 is hydrogen dioxide; $AgNO_3$ is silver nitrate; NH_3 is ammonia; HgCl is mercurous chloride; $HgCl_2$ is mercuric chloride; Na_2SO_4 is disodic sulphate; NaCl is sodium chloride; HgO is mercuric oxide.

3. *Hydrogen:* Symbol, H; atomic weight, 1; valence, 1; is a colorless, odorless, tasteless gas, the lightest substance known, the unit of atomic and molecular weights, does not support combustion, but when lit burns with a pale blue flame which gives very little light but intense heat, combines explosively with chlorine in sunlight, is a necessary ingredient in all acids.

$$Zn + 2HCl = ZnCl_2 + H_2$$

4. Carbon, hydrogen, oxygen, and nitrogen.

5. (*a*) *Coagulation test:* The urine must be perfectly clear. If not so, it is to be filtered, and, if this does not render it transparent, it is to be treated with a few drops of magnesia mixture, and again filtered. The reaction is then observed. If it be acid, the urine is simply heated to

near the boiling point. If the urine be neutral or alkaline, it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present, a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of HNO_3.

(*b*) *Nitric acid test:* Pour into a clean test-tube a layer of HNO_3 about half an inch deep; then with a pipette carefully float on to the surface of this acid a layer of urine, taking care that the liquids do not mix. If albumin is present a cloudy ring, with sharply defined borders, will appear at the point of junction of the two layers.

(*c*) *Fehling's test:* Place in a test-tube a few c.c. of the liquid prepared as stated below, and boil; no reddish tinge should be observable, even after five minutes' repose. Add the liquid under examination gradually, and boil after each addition. In the presence of sugar a yellow or red precipitate is formed. In the presence of *traces* of glucose only a small amount of precipitate is produced, which adheres to the glass, and is best seen when the blue liquid is poured out.

[The reagent must be kept in two solutions, which are to be mixed immediately before use. Solution I consists of 34.653 gms. of crystallized $CuSO_4$, dissolved in water to 500 c.c.; and Solution II of 130 bms. of Rochelle salt dissolved to 500 c.c. in NaHO solution of sp. gr. 1.12. When required for use equal volumes of the two solutions are mixed, and the mixture diluted with four volumes of water.]

(*d*) *Boettger's test:* Render the urine strongly alkaline by addition of Na_2CO_3. Divide about 6 c.c. of the alkaline liquid in two test-tubes. To one test-tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color.—(From Witthaus' *Essentials of Chemistry.*)

DISEASES OF CHILDREN.

1. The onset of the affection varies; it may be acute, subacute, or chronic; it is usually sudden, with an attack of mild fever of a remittent type, of a few days' duration, on recovery from which it is noticed that the child is paralyzed. Rarely the paralysis may be preceded by convulsions. The paralysis may affect both arms and both legs, the legs alone, or only one of the four extremities; it may, very rarely, be a hemiplegia. As a rule, however, the leg suffers more frequently than the arm; in paralysis

of the leg the muscles below the knee suffer more severely than those above. The bladder and rectum are not affected, or, if so, only temporarily, and anesthesia or numbness cannot be detected. The temperature of the paralyzed limb is low and the part is cyanosed in appearance. After a few days there is a slight improvement in the paralyzed parts, although the muscles show a rapid wasting, which is progressive until all muscular tissue is gone. The reflex movements are impaired or abolished. The electro-contractibility by the faradic current is abolished in the paralyzed parts. With the galvanic or constant current the 'reactions or degeneration' are developed." (Hughes' *Practice of Medicine.)*

2. The child should be put to bed; all food must be withheld; water or ice may be allowed to quench thirst; if the child is very weak a few drops of brandy may be given. Warm baths or mustard poultice may be given for the abdominal pain; the stomach should be washed out and the colon irrigated.

℞. Tinct. opü deodorat. ♏j.
Bismuthi subnitrat., gr. v.
Mist. cretæ, ʒj. M.
Sig.: Every two hours, as long as necessary.

3. Rest to the voice, and if necessary the child should be put to bed. The room should be at an even temperature and the air saturated with moisture. Aconite, potassium citrate or Dover's powder may be given.

℞. Chloral hydrat., gr. xx.
Potass. bromid., gr. xxx.
Syrupi acaciæ, ʒij. M.
Sig.: One teaspoonful every two hours.

4. *Measles:* Period of incubation, ten to twelve days. Stage of invasion, four days. Character of eruption, small dark red papules with crescentic borders, beginning on face and rapidly spreading over the entire body; desquamation is branny. The eruption is darker, less uniform, more shotty; the temperature is lower, pulse slower, the tongue is not of the "strawberry" type; coryza, coughing, and sneezing may be present; Koplik's spots are present.

Scarlet fever: Period of incubation, from a few hours to seven days. Stage of invasion, twenty-four hours. Character of eruption, a scarlet punctuate rash, beginning on neck and chest, then covering face and body; desquamation is scaly or in flakes. The eruption is brighter, is on a red background, punctiform, and is more uniform; the temperature is higher, the pulse quicker: the tongue is of the "strawberry" type, the lymphatics in the neck may be swollen, and there is sore throat; Koplik's spots are absent.

5. Tinct. aconite, ♏⅛; phenacetin, gr. ¼; tinct. opii

camphorata, ♏j; quinine (sulphate), gr. ½; syrup of ipecac, ♏½; ammonium chloride, gr. ⅛; spiritus etheris nitrosi, ♏j; comp. spts. of ether, ♏j; sodium bromide, gr. ½.

MATERIA MEDICA AND THERAPEUTICS.

1. An *official drug* is one that is listed in the Pharmacopœia.

2. A *fluidextract* is a solution of a vegetable drug of such strength that 1 c.c. of the fluidextract represents 1 gram of the drug.

A *spirit* is an alcoholic solution of a volatile substance.

An *infusion* is a fluid preparation made by steeping a vegetable substance in boiling water.

A *decoction* is a fluid preparation made by boiling a vegetable substance in water.

3. ACONITE. *Official name,* Aconitum; *botanical name,* Aconitum Napellus; *common name,* Monk's-Hood; *part* used, the root; *official preparations,* fluidextract and tincture; *official alkaloid,* aconitine; *physiological action,* first stimulates and then paralyzes heart and also sensory nerves, lowers blood pressure, dilates peripheral blood-vessels, is a respiratory sedative, reduces body temperature, is a diuretic and diaphoretic.

Therapeutic indications: For fevers, some inflammatory conditions, in high arterial tension, in nervous palpitation of the heart, and congestive dysmenorrhea; also externally for neuralgia, pruritis, herpes, chilblains, etc.

BELLADONNA. *Official name:* Belladonna; *botanical name:* Atropa Belladonna; *common name:* Deadly nightshade; *parts used:* leaves and root; *official preparations:* tincture, extract, plaster, and ointment (of the leaves); and fluidextract and liniment (of the root); *official alkaloid:* atropine; *physiological action:* anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood pressure, but toxic doses cause the blood pressure to fall, stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

Therapeutic indications: To relieve pain, relax spasm, check sweating, as a mydriatic. for night sweats, to check griping of purgatives; in asthma, to check fevers, in heart disease, shock and collapse, acute coryza, urinary incontinence, chordee, low delirium of fevers, mania, alcoholism; as an antigalactagogue, spasmodic cough.

DIGITALIS. *Official name:* Digitalis; *botanical name:* Digitalis purpurea; *common name:* Purple foxglove; *parts used:* dried leaves; *official preparations:* extract, fluidextract, tincture, and infusion; *official alkaloids,* none; *physiological action:* it is a gastrointestinal irritant, it

slows the rate of the heart, prolongs diastole, increases the force of the heart, it contracts the blood-vessels and causes a rise in blood pressure, it also acts as a diuretic.

Therapeutic indications: In heart diseases (1) when the heart action is rapid and feeble, with low arterial tension; (2) in mitral lesions when compensation has begun to fail; (3) in non-valvular cardiac affections; (4) in irritable heart, due to nerve exhaustion; also cardiac palpitation, irritable heart from nerve exhaustion, cardiac and renal dropsy, and exophthalmic goiter.

ERGOT. *Official name:* Ergota; *botanical name:* Claviceps purpurea; *common name:* Spurred rye; *parts used:* the sclerotium; *official preparations:* extract, fluidextract, and wine; *official alkaloids:* none. *Physiological action:* Ergot stimulates and causes contraction of involuntary muscle fibers, hence it is a vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative, it raises the blood pressure, it increases peristalsis, and is an emmenagogue.

Therapeutic indications: To promote uterine contractions during third stage of labor; fibroids, menorrhagia, postpartum hemorrhage. Some forms of amenorrhea and dysmenorrhea, dysentery, arterial hemorrhage, congestive headache, laxity of sphincters, of bladder or rectum, hemorrhoids, aneurysm, diabetes, urinary incontinence, direct paralysis of the sphincter vesicæ, atonic spermatorrhea.

NUX VOMICA. *Official name:* Nux vomica; *botanical name:* Strychnos nux vomica; *common name:* Quaker button, or poison nut; *parts used:* seeds; *official preparations:* extract, fluidextract, tincture, strychnine (with its sulphate and nitrate); *official alkaloid:* strychnin; *physiological action:* It excites the digestive secretions, increases the appetite, increases peristalsis, and improves the digestion; it is a vasoconstrictor, it raises blood pressure, and is a cardiac stimulant; it is also a respiratory stimulant; hearing and sight are rendered more acute.

Therapeutic indications: As a general tonic or bitter; in indigestion, cardiac depression, impaired peristalsis, pneumonia, phthisis, amenorrhea, dysmenorrhea, impotence, some forms of paralysis, chorea, epilepsy, neuralgia, alcoholism, and urinary incontinence.

OPIUM. *Official name:* Opium; *botanical name:* papaver somniferum; *common name:* white poppy; *parts used:* capsule; *official preparations:* powdered, granulated, and deodorized opium; extract, tincture, camphorated tincture, tincture of deodorized opium, tincture of ipecac and opium, pills, wine, vinegar plaster, and powder of ipecac and opium: *official alkaloids:* morphine, codeine. *Physiological action:* It is analgesic, hypnotic, diaphoretic, narcotic, a respiratory and cardiac stimulant (later a depressant), it

checks most secretions (not perspiration), it stimulates the brain, and contracts the pupil.

Therapeutic uses: As an anodyne, a hemostatic, in inflammations, as an expectorant, in diarrhea, in alcoholism, manias and diabetes, as an antispasmodic, in insomnia, and as a diaphoretic.

4. *Dose of:* Apomorphinæ hydrochloridum, gr. 1/30 (expectorant), gr. 1/10 (emetic); hydrargyri iodidum flavum, gr. 1/5; cocaina, gr. ss; phosphorus, gr. 1/125; pilocarpinæ hydrochloridum, gr. 1/5; resina podophylli, gr. 1/6; santoninum, gr. j; tinctura aconiti, ♏x; tinctura gelsemii, ♏viij.

5.

	OFFICIAL NAMES.
Basham's mixture...	Liquor ferri et ammonii acetatis; solution of iron and ammonium acetate.
Carron oil.....	Linimentum calcis; lime liniment.
Dover's powder.....	Pulvis ipecacuanhæ et opii; powder of ipecac and opium.
Gray powder.....	Hydrargyrum cum creta; mercury with chalk.
Hoffman's anodyne.	Spiritus ætheris compositus; compound spirit of ether.
Lugol's solution....	Liquor iodi compositus; compound solution of iodine.
Monsel's solution...	Liquor ferri subsulphatis; solution of ferric subsulphate.
Spirit of Mindererus.	Liquor ammonii acetatis; solution of ammonium acetate.
Tartar emetic.....	Antimonii et potassii tartras; antimony and potassium tartrate.
Donovan's solution..	Liquor arseni et hydargyri iodidi; solution of arsenic and mercuric iodide.

Carron oil is chiefly used for burns; Dover's powder contains 10 per cent. each of ipecac and opium.

6. *"General antidotes* have been devised for use when the nature of a poison is unknown, with the object of a 'shot-gun prescription,' intended to hit something. One of the best is *Jeaunel's,* composed as follows: Liquor ferri sulphatis, ℥ijss; magnesia calcinat., ℥ij; carbo animalis, ℥j; aqua, ℥xx. These ingredients should be kept separate —the solution of the sulphate in one vessel, the others together. When needed, the former should be added to the latter and violently agitated. Dose, ℥jss to ℥iij. This is a perfect antidote for arsenic, zinc, digitalin, etc. It delays the action of the salts of copper, morphine and

strychnine, and slightly influences compounds of mercury. It is valueless for cyanide of mercury, tartar emetic, hydrocyanic acid, phosphorus, or the caustic alkalies. If the nature of the poison is entirely unknown, a harmless yet effectual antidote in most cases is one composed of equal parts of magnesia, wood charcoal, and the hydrated ferric oxide, given freely in plenty of water."—(Potter's *Materia Medica*, etc.)

7. *Four specifics:* Quinine, for malaria; diphtheria antitoxin, for diphtheria; mercury, for syphilis; colchicum, for gout.

8. *Opium* has the power of relieving pain arising from almost any cause, it is especially useful in pain occasioned by gross lesions—inflammation, traumatism, and morbid growths. In the various so-called functional pains, such as headache and neuralgia, the coal-tar derivatives—*antipyrin, phenacetin,* and *acetanilid*—are more serviceable analgesics. *Cannabis indica* somewhat resembles opium in its action as an analgesic, but it is far less powerful. It is especially useful in neuralgia and migraine. The *bromids,* by depressing the cerebral cortex, often afford relief in headache, but in other forms of pain they usually fail. Some drugs seem to have an affinity for certain nerves; thus *gelsemium* and *butyl chloral hydrate* are often distinctly valuable in trifacial neuralgia."—(Stevens' *Materia Medica.*)

9. CHLORAL, SULPHONAL, and TRIONAL: *Chloral hydrate* produces a natural sleep, acts promptly, but is of no service if pain is present; it also lowers the body temperature. It can be given for a long time without deleterious effect, but it may irritate the tissues and weaken the heart. *Sulphonal* produces a natural sleep, but is of slow action, requiring three or four hours to take effect; it is of no use if pain is present, does not irritate the tissues and weaken the heart, but is probably not so good for continuous use as chloral hydrate, though the two may replace each other for a time. *Trional* is very similar to sulphonal, but is more soluble, and acts quicker. Both sulphonal and trional are supposed to be safer than chloral.

10. For *hyperpyrexia:* Brand bath.

For *diarrhea:*

℞. Pulv. ipecac et opii, gr. v.
Tannin, gr. ix.
Mucil. acac., ʒj. M.

Sig.: Mix with two ounces of warm water, and inject into the bowel with a long tube after each evacuation.

For *hemorrhage:*

℞. Acid sulphuric aromatic, ʒj.
Liquoris opii sedativi, ♏xv.
Aquæ cinnanmomi q.s. ad ʒvj. M.

Sig.: Two tablespoonfuls every hour for six doses, and then every three hours.

For *perforation:* Immediate operation.

PRACTICE OF MEDICINE.

1. *Vesicular breathing* is that which is heard normally over the air vesicles of the lungs; *bronchial breathing* is that which is heard normally over the trachea and bronchi. Bronchial breathing, elsewhere, denotes consolidation of the lung, phthisis, pneumonia, pleuritic effusion, hemorrhagic infarction or syphilis of lung.

2. By *cardiac compensation* is meant the changes in the heart muscle (hypertrophy, etc.), due to effort on the part of the heart to meet the increased work thrown upon it in case of valvular lesions. *Symptoms of broken compensation* are: Dyspnea, cyanosis, edema, cough, hemoptysis, and disturbances of stomach, liver, or kidney.

3. In *gastralgia* there are paroxysms of intense pain at irregular intervals and with no relation to eating, and lasting for a few minutes or up to hours; vomiting is rare; it *may* be relieved by pressure or food.

In *gastric ulcer* the pain is localized and is associated with eating; vomiting often occurs from half an hour to two hours after eating; indigestion is common; there is hyperacidity.

4.

	AMOUNT IN 24 HOURS.	SPECIFIC GRAVITY.
Normal	About 40 to 50 ounces.	About 1015 to 1025.
Acute nephritis.	Diminished.	About 1025 to 1030+
Chronic interstitial nephritis	Greatly increased.	1010, 1005, or less.
Chronic parenchymatous nephritis.....	Diminished.	High or low.
Diabetes mellitus.....	Greatly increased.	1030 to 1045.

5. *Facial paralysis.* "If the paralysis is of peripheral origin, involving the facial nerve only and not constituting a part of a hemiplegia, the eye cannot be completely closed, and the forehead cannot be wrinkled, owing to paralysis of the orbicularis palpebrarum and the occipito-frontalis. The tongue, if protruded, does not in reality deviate from the middle line, as may be determined by watching its relation to the central upper incisors, the genio-hyo-glossus not having been affected. The apparent deviation is due

to the pulling of the mouth to the sound side. If the paralysis is of central origin, the upper branch of the facial is but slightly affected, the power of closing the eye and wrinkling the forehead is largely retained, and the tongue deviates toward the paralyzed side, as the genio-hyo-glossus usually loses its power and its healthy fellow is unopposed."—(Butler's *Diagnostics of Internal Medicine.*)

The reaction of degeneration appears in the *peripheral* form.

The paralysis may depend either upon (1) central causes —*i.e.* blood-clots of intracranial tumors pressing on the nerve before its entrance into the internal auditory meatus. It is also one of the nerves involved in *bulbar paralysis;* or (2) it may be paralyzed in its passage through the petrous bone by damage due to *middle-ear disease* or by *fractures of the base;* or (3) it may be affected at or after its exit from the stylo-mastoid foramen. It may be due to exposure to cold or injury of the nerve, either from accidental wounds of the face or during some surgical operation, as removal of parotid tumors, opening of abscesses, or operations on the lower jaw.—(Gray's *Anatomy.*)

6. In *diphtheria* the onset is more gradual; the temperature rises to about 101° F.; the tonsils are not much enlarged; there is an exudate of a thick, grayish membrane which is very adherent, is removed only with difficulty, and leaves a bleeding surface; this membrane soon reforms and may be found on the fauces and pharynx as well as on the tonsils; in the exudate the Klebs-Loeffler bacilli may be found. In *follicular tonsillitis* the onset is more sudden; the temperature may be a little higher than that of diphtheria; there is no membrane, but the tonsils are red and swollen, and in the crypts are seen white, cheesy spots or plugs, which consist of broken-down epithelium, and are easily brushed away; Klebs-Loeffler bacilli are never found.

7. *Arteriosclerosis* is a physiologic accompaniment of old age, and it is often hereditary. Rheumatism, syphilis, alcohol, heart-disease, and kidney-disease are the most common causes. The process may affect the valves of the heart, setting up disease of these parts. Sudden distention may rupture the smaller vessels in the brain, giving rise to apoplexy; or, if in the larger vessels, an aneurysm may ensue.

Symptoms: Increased tension in the pulse, causing a hardness, often feeling like "pipe-stems." Great hypertrophy of the cardiac muscle ensues. The coronary arteries may be involved, leading to fibroid degeneration, fatty degeneration, and the symptoms of angina pectoris, absence of compensation, dyspnea, scanty urine, and other symp-

toms. The cerebral arteries may be involved, and hence apoplexy is common. The kidneys may next suffer, giving rise to interstitial nephritis or contracted kidney.—(*Pocket Cyclopedia.*)

8.

STRANGULATION.	INTUSSUSCEPTION.	TWISTS (VULVULUS)
Subjective Symptoms.	*Subjective Symptoms.*	*Subjective Symptoms.*
1. Generally occurs after age of 20.	1. Most frequent in childhood.	1. Most frequent after age of 30.
2. Pain localized, rapid collapse.	2. Constant tenesmus.	2. Pain diffuse.
3. Pain intense, paroxysmal in character.	3. Pain develops suddenly and is continuous.	3. Pain paroxysmal; recurs less often than in strangulation.
4. Constipation complete.	4. Frequent diarrhea, passage of bloody mucus.	4. Constipation complete.
Objective Symptoms.	*Objective Symptoms.*	*Objective Symptoms.*
1. Temperature often subnormal.	1. Temperature normal or subnormal.	1. Temperature slightly elevated.
2. Pulse very weak.	2. Same as in strangulation.	2. Same as in strangulation.
3. Stercoraceous vomiting comes on early.	3. Same as in strangulation.	3. Same as in strangulation.

9. The spleen is enlarged and tender; pulse is rapid, soft, full, and compressible; edema or hemorrhage may occur; nausea, vomiting, and diarrhea are observed; the leucocytes are enormously increased, myelocytes are present, nucleated red cells are also seen, the hemoglobin estimate is low.

10. *For anemia:*

℞. Massæ ferri carbonatis, ʒj.
Arseni trioxidi, gr. j.
Quininæ sulphatis, gr. xxx.
Misce et fiat massa in pilulas no. xxx dividenda.
Signa: Take one three times a day.

OBSTETRICS AND GYNECOLOGY.

1. *Version* is a manipulation by which the presentation of a fetus is changed. *Indications for version* are: (1) In

transverse presentations, (2) in *placenta prævia;* (3) in mal-presentations of the head; (4) in simple flattened pelvis, and in minor degrees of pelvic contraction; (5) in prolapsed funis; (6) in sudden death of the mother, and (7) in any case where speedy delivery is imperative. *Dangers of version:* Laceration, sepsis, hemorrhage, rupture of uterus, injury to or death of fetus.

2. At first the uterus sinks into pelvis, later it rises, and continues to rise till about two weeks before labor, when it again sinks. At an early stage it also becomes anteverted.

3. Labor is divided into three stages. The *first stage* begins with the commencement of labor, and ends with the complete dilatation of the os uteri. The *second stage* begins with a complete dilatation of the os uteri, and ends with the birth of the child. The *third step* immediately follows the second, and ends with the expulsion of the placenta and the beginning contraction of the uterus.

4. *Dangers of ergot:* It has been objected (1) that it may produce tetanic contractions of the uterus and so cause rupture of the uterus, death of the mother, or asphyxiation of the child; (2) that it increases the chances of lacerations of the cervix and perineum; (3) that it tends to cause retention of clots and membranes, etc.; and (4) that it retards the secretion of milk. Ergot may be given after the placenta is delivered.

5. *Ectopic pregnancy* is a pregnancy where the fetus is being developed outside of the uterine cavity. It may be interstitial, tubal, ovarian, or abdominal. *Symptoms of tubal pregnancy* will be signs of early pregnancy, hypogastric or inguinal pains, probable history of a previous sterility, probable expulsion of decidual membrane or shreds, softening of the cervix, enlargement of the uterus, presence of a distended tube, contractions of the wall of the gestation sac; if rupture occurs, there will be sudden, excruciating pains over the lower abdomen and on the affected side, shock, collapse, and symptoms of internal hemorrhage. *Treatment* is laparotomy, with complete removal of fetus, membranes, clots, etc.

6. *Acute peritonitis* gives: Intense and diffuse abdominal pain, tenderness, distention, vomiting, constipation, fever, pulse hard and small and rapid, increased respiration, dorsal decubitus with flexed thighs and legs.

7. Hemorrhage, leucorrhea, offensive discharge, pain, cachexia, and tumor.

8. The relative advantages and disadvantages of the abdominal and vaginal routes in pelvic surgery are thus summarized by Dudley (*Diseases of Women*):

Advantages of the abdominal route: (1) A large field is open for operation; (2) the operator may see what he is

doing instead of depending largely on touch; (3) diagnosis of unsuspected conditions and complications is much easier; (4) the abdominal section is adapted to large tumors and pus sacs, and to conditions high in the pelvis; (5) the appendages may be removed with better chance of avoiding rupture of a pus sac; (6) there is less danger of wounding intestines, bladder, or ureters and greater facility in the control of hemorrhage; (7) the frequent concurrence of appendicitis and other abdominal lesions with pelvic disease and the impossibility of reaching them by the vagina; (8) it gives more light and more space for conservative work.

Advantages of the vaginal route: (1) It gives better drainage, and is therefore specially adapted to cases of vesical or intestinal fistulæ; (2) it avoids abdominal scar and risk of ventral hernia; (3) it is suitable for cases of small tumors without high adhesions; (4) when properly performed it lessens the danger from shock, and is therefore suitable to cases of extreme pelvic infiltration which are inoperable, because too dangerous, by the abdominal route; (5) it involves less handling of the intestines, and therefore less consequent danger of intestinal adhesions; (6) recovery is less complicated and more rapid.

Unfortunately, the vaginal route is, for at least a very large proportion of cases, impracticable. The long, narrow virgin vagina or the vagina which has become contracted from senile atrophy may render the field of operation almost inaccessible. A very large uterus with exceptionally short, thick, broad ligaments and greatly enlarged appendages, with adhesions extending beyond the reach of the finger, may also be difficult or impossible to manipulate through the vagina. Under such conditions the abdominal route is much safer.

SURGERY.

1. Pyothorax is empyema. Pneumococci, streptococci, and staphylococci are found. *Treatment* should be undertaken without delay. Aspiration seldom cures, but may be undertaken where the dyspnea is great, and an anesthetic given afterwards for the excision of a piece of rib. Drainage is always necessary, and is best done by excising a portion of the fifth or sixth rib in the mid-axillary line. The patient should be allowed to come round quickly from the anesthetic, so that the coughing which occurs will expel the masses of coagulated lymph and help to expand the lung. A big drainage-tube is then inserted. Daily dressings are necessary, but irrigation of the cavity is seldom needed. If, because of delay in treatment, the cavity does not soon close, Estlander's operation, or some modi-

fication, must be performed. The wound must be enlarged and a number of ribs exposed, and sufficient of them removed to convert the cavity into a pyramidal one, the base of which is the open wound. This is packed with gauze and allowed to heal from the bottom. If the operation has to be extensive, the flaps are allowed to fall back upon the granulating surface of the lung, and in these cases marked scoliosis and weakness of that side of the chest follow."—(*Aids to Surgery.*)

2. *Ascites* is an accumulation of fluid in the peritoneal cavity. It is a symptom and not a disease. It may be caused by: Nephritis, diseases of the liver, especially atrophic cirrhosis; heart disease; presence of abdominal tumor; tuberculosis or chronic peritonitis. *Treatment:* Paracentesis. The bladder should first be emptied. The patient sits on the edge of the bed or is propped up by means of pillows. The operator, after anesthetizing the parts, makes a short incision about 1½ inches below the umbilicus, dividing the superficial tissues; then, with a quick motion, thrusts in a trocar and cannula (a sufficient distance, varying in different individuals); the trocar is then withdrawn, allowing the fluid to escape. Pressure over the abdomen may be made by means of a 4-tailed bandage to prevent collapse. Whisky (3½) may also be given while the fluid is draining away. Any sign of fainting on the part of the patient is an indication that the operation should cease. The operation may be repeated frequently.

3. *Tenotomy of internal rectus:* "The speculum is introduced and the eyeball drawn outward, if necessary, by an assistant. The conjunctiva over the lowest portion of the insertion of the muscle, together with the subconjunctival tissue and Tenon's capsule, is seized with a pair of fixation forceps, raised and divided with scissors; the first cut divides the conjunctiva, the second Tenon's capsule. Keeping the fold raised with the forceps, a strabismus hook is introduced through the opening, passed beneath the tendon, and pushed upward until its point is seen through the conjunctiva at the upper border of the muscle. The hook is transferred to the left hand and raised so as to lift the tendon. The scissors are taken in the right hand and introduced, one branch between the tendon and conjuctiva, and the other between the tendon and sclera; the tendon is divided close to the sclera by two or more small cuts. The hook is reintroduced to make sure that no portion of the tendon has been left undivided. If the tendon has been completely divided, the hook can be advanced to the cornea without resistance; if not, the undivided fibers must be cut with scissors. The hook is again introduced and swept from behind forward, above, and below, to ascertain whether there are

any uncut fibers of attachment to the sclera which, if found, must be severed. The conjunctival wound is closed with one or two vertical sutures."—(May's *Diseases of the Eye.*)

4. "Two equal semi-lunar flaps of skin three inches long, one antero-external, the other postero-internal, their extremities meeting at opposite points about two inches below the tuberosity of the tibia. These must be reflected up, and with them another inch of skin, embracing the whole circumference of the limb, must be dissected up. The anterior muscles must be cut as high as exposed, and the posterior ones about the middle of their exposed surface. The bones must then be sawn as high as exposed, the fibula being finished first, and the sharp prominence of the edge of the tibia removed."—(Stimson's *Operative Surgery.*)

5. Hemorrhoids, or piles, are varicosities of the hemorrhoidal veins. They may be external or internal. "*The palliative treatment* consists of rest in bed and the avoidance of any local irritation. The bowels should be kept open, and heat, sometimes cold, should be applied locally. Mild ointments may be used. After the inflammation subsides spontaneous cure sometimes results. *The application of a ligature* is the operation most often performed. The patient is placed in the Sims position, and after the field of operation has been rendered aseptic, the sphincter is divided. The rectum is irrigated with a mercuric chloride solution, 1 :5,000. A needle carrying a ligature is passed through the base of the tumor. The thread is cut and the ligature is firmly tied on each side. At least two-thirds of the pile should be excised by the scissors. Iodoform gauze is inserted, and a T-bandage is applied. Morphne (gr. ¼) is then given. The bowels should be moved on the third day."—(*Pocket Cyclopedia.*)

6. The abdomen should be shaved and scrubbed thoroughly with tincture of green soap and sterile water for at least 10 minutes on the night before the operation. A general bath should then be taken, giving special attention to the inside surfaces of the thighs and to the umbilicus. A soap poultice is applied to the abdomen and allowed to remain for several hours; this is removed, and the abdomen is scrubbed with alcohol and washed with mercuric chlorid solution (1 :1,000). A towel wet with this solution is placed over the abdomen, and a binder is applied. "The portion of gut to be removed is drawn from the body, and the peritoneal cavity protected by gauze packing. The loop is emptied by stripping with the fingers, and clamps placed on the bowel on each side of the proposed incision. In the absence of intestinal clamps, gauze or

rubber tubing may be tied around the bowel. The mesentery is then ligated in sections, a short distance from the bowel, and divided; in malignant disease particularly, a V-shaped portion of the mesentery is removed, great care being exercised not to cut off the blood supply of the bowel which is to remain. The bowel is divided somewhat obliquely, removing more at the free than at the mesenteric border, in order to give a greater circumference, and to assure a good blood supply to the antimesenteric portion. The ends are united by end-to-end anastomosis, or they are closed by sutures and a lateral anastomosis performed. The opening in the mesentery is closed, and any excess folded and held in place by sutures."—(Stewart's *Surgery*.)

7. *Shock* is the name given to a sudden and general depression of the vital powers, due to some strong stimulation (such as injury or emotion), acting on the vital centers in the medulla and producing vasomotor paralysis. Shock is *primary* when the symptoms appear promptly; it is *secondary* when the symptoms don't appear for several hours (often observed after railway accidents, intoxication, etc.). *Treatment of shock:* Place the patient in the recumbent position, with the head low, apply warmth to the body, administer a stimulant, and give a hot saline infusion; morphine, hypodermically, may be necessary for the relief of pain. It is often very difficult to differentiate shock from hemorrhage; but as a rule, in shock the symptoms are at their worst immediately after the injury, and tend to improve with time; and the nervous symptoms are more prominent from the first (dilated pupils, unconsciousness, etc.).

8. Carcinoma of Cervix. *Symptoms:* Hemorrhage, leucorrhea, offensive discharge, pain, and cachexia. *Treatment:* Hysterectomy. *Predisposing cause:* Laceration and inflammation.

9. *Intestinal perforation* may be due to impaction of foreign body, ulcer (as in typhoid or tuberculosis), inflammation following strangulated hernia. *Symptoms:* Pain, shock, collapse, lowered body temperature, weak pulse. *Treatment:* The abdomen should be opened immediately, the perforation found, and sutured, the peritoneum flushed out with saline solution and drained.

10. *Use of X-rays:* To aid in diagnosis of fractures, injuries around a joint, foreign bodies, sometimes also of calculi. The treatment of epithelioma by *x*-rays is uncertain; reports are discouraging.

11. Silk should be boiled for half an hour, and wound loosely on reels. It should then be kept for at least a week in 1:1,000 corrosive sublimate solution. *Silkworm gut* requires to be boiled only.

OHIO.

STATE BOARD EXAMINATION QUESTIONS.

OHIO STATE MEDICAL BOARD.

ANATOMY.

1. How and where is the clavicle attached to the scapula?
2. What are the different kinds of motion of the elbow joint, and name the bones entering into its formation?
3. Name the ligaments of the hip joint.
4. Name the muscles that flex the thigh, also the leg.
5. Give the course and subdivisions of the subclavian artery.
6. Name the three divisions of the axillary artery.
7. Name the superficial veins at the bend of the elbow.
8. Give shape, location, dimensions and capacity of the stomach.
9. What are the divisions of the trifacial nerve? Name the branches of the third division.
10. Give the boundaries of the popliteal space.

PHYSIOLOGY.

1. What are the properties of protoplasm? What is its relation to nutrition?
2. What are the functions of organized cells?
3. Describe the white blood cells. What conditions affect their relative number, within physiological limits?
4. What salts affect the action of the heart and how?
5. What is the principal source of heat in the body?
6. What part of digestion takes place in the stomach?
7. What kind of food does the secretion of the liver assist in digesting? What other office has it?
8. Describe the portal circulation.
9. Describe the motor area of the brain.
10. Give the location of the center of vision. How is this determined?

MATERIA MEDICA AND THERAPEUTICS.

1. Name three external antiseptic remedies. Give indications and uses.
2. Name the various preparations of aconite and give dose of each. State therapeutic uses.
3. Iodine. Name principal salts and preparations. Give dose of each and state therapeutic uses.
4. What are the uses of narcotics? Name the principal ones giving the dose of each.
5. What preparations of mercury are used as cathartics? Give dose of each.
6. What drugs would you use in anemic conditions? Write two prescriptions including remedies recommended.

7. Potassium salts. Name the principal ones and give dose and use of each.

8. Why is atropine combined with morphine? Give dose of each.

9. What are the symptoms of opium poisoning? Give treatment. What class of people bear opium badly?

10. Discuss the dangers incident to the treatment by x-ray.

CHEMISTRY.

1. Name the constituents most frequently found in water which render it unfit for drinking purposes. Give test for each.

2. Name the albuminous bodies and give the source of each.

3. Name the principal inorganic acids. Give the properties and uses of one. Name the principal organic acids. Give their sources and properties and uses of one.

4. By what tests chemically applied would you determine whether a specimen of human milk was up to the standard?

5. Give a reliable method for determining the quantity of hydrochloric acid in the gastric contents.

6. Give the chemical nature of phenol, its properties, poisonous effect and antidotes.

7. Classify poisons from a physiological basis.

8. What is alum chemically, and when may it be used to improve an impure water supply?

9. Mention three different processes by which carbon dioxide is generated in nature.

10. What is the chemical name of tartar emetic? Give its poisonous effects and antidote.

DIAGNOSIS.

1. Describe reduplication of the heart sounds. What is its significance, and state in what diseases it may occur?

2. State diagnostic significance of mitral systolic murmurs.

3. Describe irregular pulse (arrhythmia) and state clinical significance of its varieties.

4. In what morbid conditions is dyspnea present?

5. What pathological alterations of the lungs cause a decreased resonance on percussion?

6. What diagnostic sign is furnished by diplopia?

7. In what pathological conditions is the liver generally found enlarged?

8. When is the knee jerk exaggerated, and in what affections does it occur?

9. Name abnormal constituents of the stools and state their pathological significance.
10. In what diseases does hiccough occur, and what diagnostic value is derived therefrom?

PATHOLOGY.

1. What is the pathology of follicular tonsillitis?
2. What pathological changes take place in senility?
3. Give the pathology of catarrhal appendicitis.
4. What is the basis of the opsonin treatment, and describe the effect of an injection of bacterial vaccine?
5. Give the pathology of tabes dorsalis.
6. Name the paths of bacterial infection; the paths of extension.
7. Give the pathology of tuberculosis of the hip joint.
8. What is the difference between an antitoxin and a bacterial vaccine?
9. Give the pathological anatomy of catarrhal bronchopneumonia.
10. What are some of the adulterations found in foods and how would you detect them?

PRACTICE.

1. How would you manage and treat a case of diabetes mellitus?
2. Give the causes, symptoms and treatment of acute Bright's disease.
3. Give the pathology, symptomatology and treatment of poliomyelitis.
4. Give pathology, symptoms and treatment of pericarditis.
5. Define rheumatic fever; give symptoms, complications and treatment.
6. Give etiology, symptoms and treatment of erysipelas.
7. Give diagnosis and prognosis of laryngeal tuberculosis.
8. Give diagnosis of aneurism of the descending aorta
9. Give etiology and diagnosis of influenza.
10. Give pathology and diagnosis of cholera infantum. What hygienic precautions are essential to prevent it?

OBSTETRICS.

1. When the cord is around the child's neck, what serious results may occur? How obviate?
2. How would you determine the death of the fetus in utero?
3. What symptoms would indicate concealed hemorrhage?
4. Name the different displacements of the uterus and outline general treatment.
5. Give symptoms and treatment of cystitis.

6. Give symptoms and treatment of placenta prævia before term and at full term.
7. Name the diagnostic points of the fetal head and state their uses.
8. How would you manage a breech presentation, and what is the most dangerous complication?
9. Give symptoms and treatment of puerperal eclampsia.
10. Describe the formation of the placenta and decidua and give its use or function.

SURGERY.

1. What is the latest method of treating tuberculous sinuses?
2. What is hypodermoclysis? Give technique and formula for intravenous infusion, also the quantity you would use in an adult.
3. Give causes, symptoms and treatment of hip-joint disease.
4. Describe the most feasible operation for empyema of the antrum of Highmore.
5. How would you treat internal hemorrhoids?
6. Diagnose an infective exudate in the pericardial sac. How would you proceed to give relief?
7. Ligate the internal carotid artery. Give indications for so doing. What precaution is necessary?
8. What is plastic surgery? Give an example.
9. How would you treat acute septic infection?
10. What are echinococcus cysts? Where most frequently located? What is the prognosis?

DERMATOLOGY, SYPHILOLOGY AND DISEASES OF THE EYE, EAR, NOSE AND THROAT.

1. What is tinea tricophytina? Mention its principal varieties and give treatment.
2. Describe psoriasis. How is it differentiated from squamous eczema?
3. Describe acute eczema—its difference from erysipelas.
4. What is meant by the initial lesion of syphilis?
5. Describe mucous patches.
6. Define astigmatism. Mention its causes, symptoms and the means to improve the vision with lenses.
7. Describe iritis. Mention its varieties, causes and treatment.
8. Describe acute catarrhal laryngitis; give treatment.
9. Describe otitis media purulenta. What dangers may result?
10. What are the causes of nasal hemorrhage, and how can it be stopped?

OHIO.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

OHIO STATE MEDICAL BOARD.

ANATOMY.

1. The clavicle is attached to the scapula: (1) At the acromion process by the superior acromio-clavicular ligament and the inferior acromio-clavicular ligament. (2) At the coracoid process by the coraco-clavicular ligament, the conoid ligament, and the trapezoid ligament.

2. THE ELBOW JOINT: (1) The articulation between the humerus and ulna allows of flexion and extension. (2) The articulation between the head of the radius and the humerus also allows of flexion and extension. (3) The superior articulation between the radius and ulna allows of pronation and supination of the hand.

3. *Ligaments of the hip joint:* Iliofemoral, cotyloid, transverse, capsular, and teres.

4. *Muscles that flex the thigh:* Iliopsoas, sartorius, rectus femoris, pectineus, gracilis, adductor longus, adductor brevis, tensor vaginæ femoris.

Muscles that flex the leg: Sartorius, gracilis, semitendinosus, semimembranosus, biceps, gastrocnemius, popliteus.

5. *Subclavian artery* arises on the right side from the innominate artery, on the left from the arch of the aorta; and it passes outward, arching over the pleura, lying on the first rib, between the scalenus anticus and medius, and ends at the lower border of the first rib. It is divided into three parts by the scalenus anticus; the first part being from the origin of the artery to the inner border of the scalenus anticus; the second part, posterior to that muscle; and the third part from the outer edge of the muscle to the lower border of the first rib.

6. The first portion of the axillary artery is above the pectoralis minor, the second part is behind that muscle, and the third part is below it.

7. *The superficial veins at the bend of the elbow* are: Radial, median cephalic, median basilic, ulnar, cephalic, and basilic.

8. *Stomach. Shape,* variable, but roughly pyriform. *Location,* epigastric and left hypochondriac regions. *Dimensions,* variable, about 10 x 4 x 3 inches. *Capacity,* about 5 to 8 pints.

9. *Divisions of trifacial nerve:* (1) Ophthalmic; (2) superior maxillary; (3) inferior maxillary. *Branches of the third (inferior maxillary) division:* Masseteric, deep temporal, buccal, internal pterygoid, external pterygoid, auriculo-temporal, lingual, and inferior dental.

10. BOUNDARIES OF THE POPLITEAL SPACE. *Externally, above:* By the biceps. *Externally, below:* By the plantaris and external head of the gastrocnemius. *Internally, above:* By the semimembranosus, semitendinosus, gracilis, and sartorius. *Internally, below:* By the inner head of the gastrocnemius.

PHYSIOLOGY.

1. *Properties of protoplasm:* "Protoplasm is a semifluid substance which swells up but does not mix with water. It is transparent and generally colorless, with refractive index higher than that of water but lower than that of oil. It is neutral or weakly alkaline in reaction, but may under special circumstances be acid, as, for example, after activity. It undergoes stiffening or coagulation at a temperature of about 54.5° C. (130° F.), and hence no organism can live when its own temperature is raised above that point; it is also coagulated and therefore killed by alcohol, by solutions of many of the metallic salts, by strong acids and alkalies, and by many other substances."

Protoplasm has the properties of: Movement, irritability, ingestion, absorption, excretion, growth, and reproduction.

Nutrition is practically one of the properties of protoplasm, and includes ingestion and absorption as well as excretion. Nutrition is the resultant of these three processes.

2. *Functions of organized cells. Epithelial:* Absorption, protection, secretion, excretion, motion, and reproduction. *Connective:* Strength; elasticity; support; union; to form sheaths for vessels, muscles, nerves, etc.; protection; to form trabeculæ, etc.; to preserve body heat. *Muscular:* Contractility. *Nervous:* Conduction of impulses.

3. The white blood cells are spheroidal masses, varying in sizes, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named. They are probably formed in the spleen lymphatic glands, and lymphoid tissues. Their fate is uncertain; it has been asserted that they are converted into red blood cells; they play a part in the formation of fibrin ferment; they are sometimes converted into pus cells. Their *functions* are (1) to serve as a protection to the body from the incursions of pathogenic microorganisms; (2) they take some part in the

process of the coagulation of the blood; (3) they aid in the absorption of fats and peptones from the intestine, and (4) they help to maintain the proper proteid content of the blood plasma.

Conditions affecting their relative number, within physiological limits: Digestion, exercise, cold baths, pregnancy, and lactation.

4. *Salts affecting the action of the heart:* "Immersed in a solution of 0.7 per cent. of NaCl, an isolated frog's heart will retain its rhythmicality for some time, but it ultimately passes into a condition of diastolic relaxation. It is precisely the same with KCl, and if a solution of the same strength as that of NaCl is used the arrest occurs much earlier. The K ions and Na ions act precisely in the same manner; that is, they ultimately produce a condition of diastolic relaxation; moreover, K ions are more efficacious than those of Na. But with Ca ions it is different. A beating heart, if immersed in an isotonic solution of $CaCl_2$, ceases beating, but in a condition of systole (calcium rigor). If, however, a solution of NaCl is added the heart beat recurs and the strength of the contractions is increased."—(Lyle's *Physiology.*)

5. The principal source of heat in the body is muscular energy.

6. In the stomach proteids are converted into proteoses and peptones.

7. The secretion of the liver assists in digesting fats. *The other functions of the bile* are: (1) To aid in the absorption of fats; (2) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (3) to eliminate waste products of metabolism, such as lecithin and cholesterin; (4) it has a slight action in converting starch into sugar; (5) it neutralizes the acid chyme from the stomach and thus inhibits peptic digestion; (6) it has a very feeble antiseptic action.

8. *Portal circulation:* "The hepatic artery and the portal vein convey blood to the liver. The artery carries arterial blood, and the vein food-laden venous blood from the walls of the alimentary canal, and from the spleen and pancreas. Both vessels enter the liver at the transverse fissure, and they ramify in its interior, breaking up into small terminal branches which run between the lobules and send fine capillary branches into their substance; from these latter branches the blood passes into the capillary tributaries of the intralobular veins, thence to the sublobular veins, and from the sublobular veins to the hepatic veins, which terminate on the posterior surface of the liver in the inferior vena cava."—(Bain's *Medical Practice.*)

9. The *motor areas* are located and arranged on the cere-

bral cortex immediately in front of the fissure of Rolando. At the upper part of the convolutions in front of this fissure are areas connected with the movements of the lower extremities; then from above downward are located the centers for movements of the shoulders, arms, wrists, fingers, face, lips, tongue, and larynx and pharynx.

10. *The center of vision* is in the occipital lobes, and particularly in the cuneus. Removal of the right occipital lobe in an animal is followed by left hemianopsia, removal of the left lobe by right hemianopsia, and removal of both occipital lobes by total blindness.

MATERIA MEDICA AND THERAPEUTICS.

1. *Three external antiseptics:* Mercuric chloride, formaldehyde, and silver nitrate.

Mercuric chloride is used for washing the surface of a part prior to operation, also for injections and dressings; it should not be used for instruments or excretions.

Formaldehyde is used for disinfecting rooms, houses, instruments, furniture, and clothing.

Silver nitrate is used as a prophylactic against ophthalmia neonatorum, also in the treatment of that disease; also in local treatment of ear, nose, and throat diseases; in diseases of the skin, and for solutions in gonorrhea, urethritis, vaginitis, and other diseases of the genital tract.

2. ACONITE. *Official preparations, with adult dose:* Fluid extract, ♏j; tincture, ♏x. *Medicinal uses:* For fevers, some inflammatory conditions, in high arterial tension, in nervous palpitation of the heart, and congestive dysmenorrhea; also externally for neuralgia, pruritus, herpes, chilblains, etc. *Therapeutic effects:* First stimulates and then paralyzes heart and also sensory nerves; lowers blood pressure; dilates peripheral blood-vessels, is a respiratory sedative; reduces body temperature; is a diuretic and diaphoretic.

3. The official preparations and doses of iodine and the iodides are: Iodine, 1/10 of a grain; compound solution of iodine, 3 minims; tincture of iodine, 1½ minims; potassium iodide, 7½ grains; sodium iodide, 7½ grains; ammonium iodide, 4 grains; strontium iodide, 7½ grains; zinc iodide, 1 grain; diluted hydriodic acid, 15 minims; syrup of hydriodic acid, 1 dram.

"*Iodine* is alterant, rubefacient, vesicant, caustic, antiseptic, and parasiticide. It is used locally in the form of the tincture in sprains and bruises, over the chest in various lung troubles, in lupus, in chronic rheumatism, in pleurodynia and intercostal neuralgia, in ringworm, and in erysipelas. It is administered internally in diseases associated with nutritional disorders, as tuberculosis in its various forms, in hypertrophy of the thyroid gland and

tonsils, in cervical and ovarian cysts, and in the late stages of syphilis. It may be employed in inhalations. It is of value as a local application in rhinology, laryngology, and even in ophthalmology.

"The *iodides* are used to aid in the absorption of inflammatory products, as in pneumonia, pleurisy, etc., and in tertiary syphilis, chronic rheumatism, etc. In tonsillitis and sore throat they are used as a gargle (gr. 2/5 to ℥i). The most generally used iodide is that of potassium, dose, gr. 5-30 in solution. Sodium iodide and strontium iodide are often used. Dose, gr. 5-30. Ammonium iodide is the most irritant and most energetic in action. Dose, gr. 2-10. Hydriodic acid in 1 per cent. solution is frequently employed in the form of the syrup. Dose, 3i-4. The compound solution of iodide, or Lugol's solutions, is given internally in doses of ♏1-5, diluted.

"The tincture of iodine is used locally only. An ointment of iodine may be applied locally in certain inflammations."—(Gould and Pyle's *Pocket Cyclopedia.*)

4. *Narcotics are used* to relieve pain, to induce sleep, to allay irritation and spasm. *Chief narcotics:* Opium, gr. jss; morphine, gr. ¼; hyoscyamus, gr. iv; stramonium, gr. j; cannabis indica, gr. j; also alcohol, ether, and chloroform.

5. *Preparations of mercury used as cathartics:* Hydrargyrum cum creta, gr. v; massa hydrargyri, gr. v; hydrargyri chloridum corrosivum, gr. 1/30; hydrargyri chloridum mite, gr. ij.

6. *For anemic conditions:* Iron, arsenic, manganese, nux vomica.

℞. Tincturæ ferri chloridi, 3ij.
Acidi phosphorici diluti, 3iij.
Spiritus limonis, 3j.
Syrupi simplicis, q.s. ad ℥iij.
Misce. Signa: A dessertspoonful in water after each meal.

℞. Ferri sulphatis exsiccati.
Potassii carbonatis, āā 3j.
Syrupi., q.s.
Fiant pilulæ, no. xxiv.
Signa: One pill after each meal.

7. *Potassium salts:* Carbonate, gr. xv; bicarbonate, gr. xxx; acetate, gr. xxx; citrate, gr. xv; sulphate, gr. xxx; bitartrate, gr. xxx; nitrate, gr. vij; chlorate, gr. iv; permanganate, gr. j; iodide, gr. vij; bromide, gr. xv; cyanide, gr. 1/5.

The *carbonate* and *bicarbonate* are used for itching and for skin diseases; the latter is also used for dyspepsia, rheumatism, gout, jaundice, and gallstones. The *acetate* and *citrate* are used for gout, rheumatism, in dropsy, renal diseases, cardiac diseases, and in general as diuretics. The

sulphate and *bitartrate* are used as cathartics, the latter also as a diuretic. The *nitrate* is used (by inhalations of its fumes) in asthma. The *chlorate* is used for inflammatory conditions of mouth and throat. The *permanganate* is used for wounds, sores, ulcers, erysipelas, and as a douche in gonorrhea, gleet, etc.; also as an antidote to morphine poisoning. The *bromide* is used in epilepsy, insomnia, neuralgia, migraine, delirium tremens, convulsions, nymphomania. The *iodide* is used in syphilis, asthma, chronic rheumatism. The *cyanide* is used to relieve vomiting, gastrointestinal pain, and cough.

8. Atropine is often combined with morphine when the latter is used, for the following reasons: (1) To prevent nausea and insomnia; (2) to intensify the effect of the morphine, and so a smaller dose may suffice; (3) to neutralize the effect on the pupils. Dose of atropine, gr. 1/160; of morphine, gr. ¼.

9. The *symptoms of poisoning by opium* are as follows: "At first there is usually a period of excitation, marked by restlessness, great physical activity, loquacity, and hallucinations. The patient then becomes weary, dull, and drowsy; he yields to the desire for sleep, from which at first he may be roused. The lips are livid, the face pale, the pupils contracted, and the surface bathed in perspiration. The condition of somnolence rapidly passes into narcosis. The patient cannot be roused, and lies motionless and senseless, with completely relaxed muscles. The pulse, at first full and strong, becomes feeble, slow, irregular, and easily compressible; the respiration slow, shallow, stertorous, and accompanied by mucous râles. The patient rapidly becomes comatose, and, in fatal cases, dies in from forty-five minutes to fifty-six hours, usually in from twelve to eighteen hours. In cases of recovery after the stage of narcosis the pulse and respiration gradually return to the normal, and the condition of coma passes into one of deep sleep, lasting twenty-four to thirty-six hours."

Treatment: "Wash out the stomach with a dilute solution of potassium permanganate, leaving about 500 c.c. in the stomach, and maintain the respiration. In the first or second stage the 'ambulatory treatment' should be adopted to prevent, if possible, the establishment of the third stage. If this stage develop the main reliance is to be placed in maintaining the respiration by artificial methods, until the poison has been eliminated. Strong coffee, or caffein, by the mouth or rectum, are of benefit. The same cannot be said of atropine. The urine should be drawn by the catheter."—(Witthaus' *Essentials of Chemistry.*)

Infants and children bear opium badly.

10. *The dangers incident to treatment by x-ray* are: Burns, ulcers, dermatitis, and sterility.

CHEMISTRY.

1. Sewage, bacteria, lead, and refuse from factories. *Sewage* is detected by the addition of a few drops of potassium permanganate, which will be decolorized in the presence of organic (or oxidizable) matter. *Bacteria* are detected by making cultures and subsequent bacteriological examination. *Lead* is detected by the addition of hydrogen sulphide, which becomes darkened by any lead present in the water.

2. *Albuminous bodies: Protamines,* found in spermatozoa of some fish. *Histons,* found in red blood corpuscles and thymus of calf. *Globulins,* found in muscles, fibrin, and clotted blood. *Scleroproteids,* found in bone, cartilage, connective tissues, skin, hair. *Keratins,* found in skin, hair, nails. *Elastins,* found in yellow elastic connective tissue. *Collagens,* found in white fibrous tissue, gelatin. *Phosphoproteins,* found in milk and eggs. *Chondrin,* found in cartilage. *Neurokeratin,* found in sheath of medullated nerves. *Ossein,* found in bone. *Nucleoprotein,* found in the cells of the body generally. *Glucoproteins,* found in mucin and connective tissues. *Chromoproteins,* found in oxyhemoglobin. *Derived proteins,* found in the products of digestion of the proteins.

3. *Principal inorganic acids:* Hydrochloric, sulphuric, nitric, phosphoric, and boric. *Hydrochloric acid* is a colorless gas with a pungent, penetrating odor, a sharp, sour taste, acid reaction, and very irritant to the tissues. It is irrespirable and does not support combustion. It is only used for manufacturing purposes.

Principal organic acids: Acetic, citric, tartaric, butyric, tannic, lactic, and oxalic. *Oxalic acid* is a white crystalline solid, irritant, and with an acid taste. It is used for bleaching and removing stains.

4. The milk may be tested by taking the specific gravity, using Feser's lactoscope and the centrifuge.

5. *To determine the quantity of free hydrochloric acid in the gastric contents:* "To 10 c.c. of the filtrate decinormal sodium hydrate is added in such a quantity that a drop of the mixture no longer responds to Gunzburg's phloroglucin-vanillin test. The amount of the decinormal soda solution used multiplied by 10 gives the figure of the free hydrochloric acid. The percentage of free hydrochloric acid can be obtained from this figure by multiplying it by 0.00365."—(Einhorn.)

6. *Phenol* is phenyl hydroxide, C_6H_5OH. It is also called carbolic acid, but it is not an acid, nor is it an alcohol. Pure phenol is a colorless crystalline solid with a characteristic odor and an acrid burning taste, soluble in 15 parts of water, and freely soluble in alcohol and ether; it is a

powerful antiseptic, coagulates albumin, and prevents fermentation.

Symptoms of poisoning: The skin and mucous membrane (where either has been in contact with the phenol) are hardened and whitened. There are burning pains in the mouth, esophagus, and stomach; vomiting, stupor, lowered pulse and temperature, contracted pupils, syncope, collapse, and death; the urine becomes discolored (greenish or black).

Treatment: Administer albumin, saccharated lime, sodium sulphate, or alcohol; then wash out the stomach.

7. Poisons may be classified (from a physiological basis) as: Corrosives, irritants, neurotics, septic poisons, and gaseous poisons.

8. *Alum,* chemically, is a double sulphate, being aluminium ammonium sulphate, $Al_2(SO_4)_3(NH_4)_2SO_4 + 24\,Aq.$

Sometimes alum is added to turbid or polluted waters; a flocculent precipitate is formed which carries down with it many bacteria and renders the water clearer and purer.

9. *Carbon dioxide may be generated in nature* by: (1) Respiration of men and animals; (2) combustion of fuel; (3) fermentation.

10. The *chemical name* of tartar emetic is antimonyl potassium tartrate. *Poisonous effects:* Nausea, vomiting, burning pain in esophagus and stomach, intense thirst, pain on swallowing, purging, pulse first quick, then slow and weak, skin cold and moist, cramps in extremities, vertigo, syncope, loss of consciousness, and collapse. *Antidote:* Tannin, or tincture of cinchona.

DIAGNOSIS.

1. *Reduplication of heart-sounds:* "The normal heart sounds consist of two systolic and two diastolic sounds so blended as to form one systolic and one diastolic tone because of the synchronous closure of the valves of the right and left heart. Under many conditions this synchronism is so interfered with as to produce doubling or actual division of one or both sounds. The phenomenon of reduplication has aptly been compared to the sound produced by the closure of double swinging doors. A normal heart, if temporarily overacting, may be the seat of doubling or splitting of the heart sounds; but in general it may be said that, hearing a reduplicated second sound or triple rhythm at the apex, one should suspect the presence of mitral stenosis or myocardial degeneration. *Gallop rhythm* is a form of reduplication heard over the whole heart, though sometimes more plainly over one side that may be graphically represented. It is usually strongly suggestive of marked incompensation, interstitial nephritis,

emphysema, arteriosclerosis, and exophthalmic goiter."—(Greene's *Medical Diagnosis.*)

2. *Mitral systolic murmurs* may indicate: Mitral regurgitation; acute endocarditis; anemia (or chlorosis); an acute infectious disease, in children; or, in infants, a patent ductus arteriosus.

3. *Arrhythmia* occurs when the normal rhythm of the pulse is disturbed. There are five chief varieties: "(1) The *intermittent pulse* may be observed as the result of excessive eating, the habitual use of tobacco, coffee, and tea, exercise, mental excitement, myocardial disease, and reflex irritation such as produced by constipation, dyspepsia, lithemia, hypochondriasis, etc. (2) The *irregular pulse* may be due to the same causes as the preceding. As a pathological condition it is most often encountered in organic cardiac disease, especially that which gives rise to mitral regurgitation. (3) The *dicrotic pulse* is one in which the first impulse is quickly followed by another impulse or secondary wave. It owes its production largely to conditions which relax the arterial walls and lower the tension, especially adynamic affections such as typhoid fever. (4) *Pulsus paradoxus* is that condition of the pulse in which the pulse-wave becomes small and feeble during inspiration; it may occur in health but is rather common as the result of pericardial adhesions. *Waterhammer* or *Corrigan's pulse* is that pulse which is characterized by a short, sharp, strong impulse which seems to collapse under the examiner's fingers. It is best detected by holding the arm up, and is diagnostic of aortic regurgitation during compensation."—(Hughes' *Practice of Medicine.*)

4. *"Dyspnea may be due* to obstruction of the air passages, pressure upon the respiratory system from without by tumors, and distention of abdomen, diseases of the lungs and pleura, heart disease, asthma, anemia, or paralysis of muscles of respiration as the result of hemorrhage, tumors, or degeneration of the respiratory center in the medulla or toxic agents in the blood. It may be *inspiratory* when it results from obstruction, as in foreign bodies in the larynx or trachea, or it may be *expiratory,* as in emphysema or bronchial asthma. A combination is the more frequent condition. In all forms of dyspnea it is important to determine whether the shortness of breath bears any relation to exertion. Dyspnea *independent of exertion* is a serious condition and is symptomatic of severe cardiac and pulmonary disease. Dyspnea *dependent upon exertion* is less serious and is observed in health, simply debility, anemia, obesity, a..d somewhat moderate cardiac debility."—(Hughes' *Practice of Medicine.*)

5. *Decreased resonance on percussion* may be found in: Phthisis, pneumonia, pleural effusion, and hydrothorax. Areas of consolidation, especially near the surface of the lung, yield a marked dullness.

6. Diplopia (unless due to the action of alcohol or a few drugs) indicates paralysis of the ocular muscles.

7. *The liver is generally found enlarged* in: Passive congestion (usually from valvular cardiac disease), amyloid disease, cancer, fatty infiltration, hypertrophic cirrhosis, leucemia, hydatids, abscess, or gumma.—(Butler's *Diagnostics of Internal Medicine.*)

8. The knee-jerk is exaggerated when the inhibitory fibers from the cerebrum are cut off. This may occur in: Cortical hemiplegias, lateral or amyotrophic sclerosis of the cord, hysteria, neurasthenia, tetanus, or strychnine poisoning.

9. *Abnormal constituents of the stools* may be: Undigested food, blood, mucus, pus, fat, calculi, intestinal parasites, foreign bodies, and fragments of tumors.

Undigested food may indicate: Diarrhea, overfeeding, dyspepsia. *Blood:* Hemorrhage, ulcer, or cancer in stomach, intestines, or liver; fissures, hemorrhoids, portal obstruction, intussusception, acute yellow atrophy of the liver, typhoid. *Mucus:* Intestinal catarrh, inflammation of intestines, dysentery. *Pus:* Rupture of an abscess into the alimentary canal, dysentery, ulceration of intestines. *Fat:* Cancer, or inflammation of pancreas, impaction of pancreatic duct. *Calculi:* Gallstones. *Intestinal parasites:* Worms, etc.

10. *Hiccough* may occur in: Gastritis, gastrectasia, cancer of stomach, enteritis, intestinal obstruction, appendicitis, cholera, pancreatitis, disease of liver, peritonitis, tympanites, epilepsy, brain tumor, meningitis, shock, hydrocephalus, hysteria, diabetes, gout, nephritis, pleurisy, alcoholism, typhoid fever, severe hemorrhages. "The milder forms of hiccough are ordinarily of little consequence, but its onset in conditions which are known to be serious adds notably to the gravity of the prognosis."—(From Butler's *Diagnostics of Internal Medicine.*)

PATHOLOGY.

1. In *follicular tonsillitis* there are small yellowish white spots over the surface of the tonsil. This is made up of degenerated epithelium and bacteria.

2. *The chief changes that take place in senility:* Cessation of growth; loss of weight; loss of stature; brittleness of bones; rigidity of cartilages; loss of elasticity of crystalline lens; feebleness and atrophy of muscles; grayness of hair; diminution of sexual activity and power; arteriosclerosis, or other diseased conditions of the arteries; les-

sened capacity of chest; atrophy and degeneration of digestive glands, kidneys, and testicles or ovaries; slowed reflexes; impairment of the special senses.

3. In *catarrhal appendicitis*, the mucous membrane is hyperemic and thickened; epithelium is detached, Lieberkuhn's follicles are often destroyed; granulation tissue may appear.

4. The basis of the opsonic treatment is the belief that the leucocytes can be aided in their work of phagocytosis or bacteriolysis if a certain substance is added to the blood-serum.

The effect of an injection of bacterial vaccine is: Rise of temperature, pain in joints, an urticarial or erythematous rash, itching, chill, giddiness, faintness, vomiting, heart-failure, collapse, convulsions, coma.

5. In *tabes dorsalis* the posterior columns of the spinal cord and the posterior nerve roots are involved. The posterior columns of the spinal cord are gray and shrunken, and show considerable overgrowth of connective tissue in the columns of Goll, Burdach, and Lissauer; this process extends upward from the lumbosacral region; the posterior nerve roots degenerate and become atrophic. The meninges over the affected parts become opaque and adherent. Some of the cranial nerves may also atrophy, notably the optic, but also the motor oculi and vagus. The process is destructive and progressive; it is not a simple wasting, although the nerve fibers are atrophied, but it is characterized by irritation, changes in the axis cylinders, overgrowth of the connective tissue, and sometimes congestion; the spinal ganglia may be affected.

6. *Paths of bacterial infection:* Through abraided skin or mucous membrane; through mucous membrane of digestive, respiratory, or genitourinary tract; through conjunctiva.

Paths of extension: By continuity of tissue, by blood current, by lymphatics, by reinfection, or by mechanical conveyance from one place to another.

7. Tuberculosis of the hip joint may begin in the acetabulum or the femur; sometimes the primary lesion is in the synovial membrane; when this latter is involved, spreading throughout the joint is rapid. Cartilages are apt to be destroyed. Yellow or gray tubercles are found on the synovial membrane; caseous degeneration appears, and the joint is filled with broken down tissue (cold abscess). Later on, tissue around the joint is destroyed. A sinus may form.

8. An *antitoxin* consists of a product of bacteria, but not the bacteria themselves; whereas a *bacterial vaccine* is a preparation of killed bacteria.

9. *Bronchopneumonia.* There are consolidated patches,

lobular; the air vesicles in the consolidated areas have congested walls and swollen epithelial lining. They are filled with leucocytes, mucus, many epithelial cells, but no fibrin. The bronchioles are inflamed and plugged up; their walls are infiltrated with small cells. The surrounding lobules are congested and emphysematous; collapsed areas are also to be found.

10. *Some of the adulterations found in foods are:* Alum, copper, lead, lime, iron, turpentine, water, anilin colors, pepper, essences, gypsum, starch, burnt sugar, flour, potatoes, oleomargarine, chicory, acorns, turmeric, glucose, gelatin, salt, grit, sand, pollen, dirt, acids, leaves. For *detection* see some good book devoted to the subject.

PRACTICE.

1. Sugars and starches are to be avoided. Gluten bread or aleuronat should be used; saccharin may be used in place of sugar. Medicinal treatment includes codeine, arsenic, alkaline waters, and tonics. Strict observance of hygienic conditions and regular exercise are necessary.

2. *Acute Bright's disease. Etiology:* Infectious fevers, exposure to wet or cold, alcoholism. *Symptoms:* "The first evidence of the affection is the edematous condition of the face. This edema may extend and produce general anasarca. The urine is scanty, smoky in color, and of a high specific gravity. It usually contains albumin, blood cells, blood casts, epithelial casts, hyaline casts, and free renal epithelium. It may contain pus cells and pus casts, and in prolonged cases dark granular casts and dark granular cells are common. Retention of urine, uremia, intense itching of the skin, dyspnea, delusional insanity, and various palsies may occur in the course of the affection. *The treatment* consists largely in rest in bed, warmth, milk diet, and attempts at elimination of waste products. Free purgation should be secured by means of the salines, calomel, or compound jalap powder. Diaphoresis may be favored by the administration of sweet spirits of niter, and in severe cases pilocarpin, and by the use of warm baths, warm applications, or the vapor bath. Tincture of digitalis (m̃5-20 every four hours), tincture of strophanthus, or spartein (gr. ¼-½) may be given as diuretics. Infusion of cream of tartar and juniper berries may be employed. The occurrence of uremia will require prompt and energetic measures."—(*Pocket Cyclopedia.*)

3. POLIOMYELITIS. *Symptoms:* The onset of the affection varies; it may be acute, subacute, or chronic; it is usually sudden, with an attack of mild fever of a remittent type, of a few days' duration, on recovery from which it is noticed that the child is paralyzed. Rarely the paralysis may be preceded by convulsions. The paralysis may

affect both arms and both legs, the legs alone, or only one of the four extremities; it may, very rarely, be a hemiplegia. As a rule, however, the leg suffers more frequently than the arm; in paralysis of the leg the muscles below the knee suffer more severely than those above. The bladder and rectum are not affected, or, if so, only temporarily, and anesthesia or numbness cannot be detected. The temperature of the paralyzed limb is low and the part is cyanosed in appearance. After a few days there is a slight improvement in the paralyzed parts, although the muscles show a rapid wasting, which is progressive until all muscular tissue is gone. The reflex movements are impaired or abolished. The electro-contractility by the faradic current is abolished in the paralyzed parts. With the galvanic or constant current the 'reactions of degeneration' are developed. *Pathology:* The early changes are: Medullary hyperemia, vascular exudation, and inflammatory softening, although the naked eye may not recognize any changes. Microscopic examination reveals inflammatory softening of the anterior horns of the gray matter. Among other constant lesions are trophic degeneration of the multipolar ganglion-cells and of the anterior nerve-roots. The changes noted as occurring in the cord are usually limited to the dorso-lumbar and cervical enlargements. As a direct result of the changes in the trophic centers and the nerve degeneration of the muscular fibers supplied, there ensue changes in the bones and joints, leading to great deformities. *Treatment:* During the febrile stage the patient should be placed at rest in bed and all the secretions rendered free. If the affection is suspected at this period the limbs should be wrapped in cotton-wool and ergot administered to lessen the spinal congestion. Counterirritation is unnecessary. As soon as the febrile reaction has subsided and the paralysis becomes manifest the child should be well fed and taken outdoors once daily. Gentle friction should be applied to the affected muscles at first, followed later by the hot spinal douche and mild galvanism. Internally, quinine, belladonna, ergot, and potassium iodide may be of value. Later, as improvement takes place, tincture of nux vomica, ℥i to iii, three times daily, or hypodermic injections of strychnine sulphate, gr. 1/16 to 1/100, according to the age, twice a week, and faradism to the paralyzed muscles, are to be used. Means should be taken to prevent deformities."—(Hughes' *Practice of Medicine.*)

4. *Pericarditis* is a disease usually occurring in the course of acute rheumatism, chorea, or septicemia; it is also occasonally seen in influenza, pneumonia, Bright's disease, and some other conditions. It bears the same relation to the heart as pleurisy does to the lungs, and, like pleurisy, may

be "dry" or accompanied by an effusion of fluid into the pericardial sac, either serous or purulent in character. *The symptoms* are pain and tenderness over the heart region, pyrexia, increased pulse rate, and dyspnea. A "friction sound" can be heard. After a few days fluid is poured out into the pericardium, and the action of the heart may be seriously impeded. In the large majority of cases the effusion is fairly rapidly absorbed if the patient is carefully treated; but in some the heart's action becomes more and more embarrassed, the pulse becomes more rapid, weak, and irregular, and ultimately fails altogether. In the cases which recover the heart often remains permanently weakened, owing to adhesions forming between the layers of the pericardium. *In the treatment* of pericarditis the first essential is absolute rest in bed, light, easily digested food, and complete quiet. Leeches are often applied for the relief of pain, and sometimes opium or morphine may be necessary. Paracentesis pericardii may be necessary.

5. *Rheumatic fever.* "The onset of the affection is usually sudden, although anorexia, sore throat, vague pains, etc., may precede. The inflammation first attacks the large joints, and may subside quickly in one joint to attack another. It is attended by high fever (103° to 104° F.), rapid pulse, and profuse acid sweats. The urine is scanty, high-colored, and contains an excess of uric acid and urates. Hyperpyrexia, organic heart disease, pneumonia, pleurisy, cerebral symptoms, various cutaneous eruptions, and rheumatic nodules may occur as complications. *The treatment* consists in rest of the parts, and patient should lie between blankets. The joints should be enveloped in soft wool or flannel. Restricted diet is essential. Fractional doses of calomel (gr. ¼ every hour for 6 hours) should be administered, followed by a saline purgative. Salicylic acid or its derivatives may be given in full doses, and diuretics are especially indicated. Hyperpyrexia may be controlled by phenacetin (gr. 5). During the convalescence, tonics are of decided advantage. Locally, lead-water and laudanum or belladonna liniment may be used. The diet should be carefully regulated."—(*Pocket Cyclopedia.*)

6. *Erysipelas* is caused by the streptococcus erysipelatis. There is an acute inflammation of the skin and subcutaneous tissue, redness, swelling, pain, heat, and constitutional disturbance. The redness is sharply defined; the swelling is elevated and is firm, tender, and hot. Tonics and nutritious food are indicated; tincture of chloride iron ♏x every two hours; the patient should be isolated; cold wash of mercuric chloride solution, or ice water may be applied.

7. *Laryngeal tuberculosis* is usually secondary to pulmonary tuberculosis. The symptoms are hoarseness, pain on

deglutition, distressing cough, hemoptysis, and frequent attacks of aphonia. Physical examination reveals paleness, ulceration, and hypertrophy of the mucous membrane and sometimes caries and necrosis. Edema of the larynx commonly occurs. *Treatment:* The local treatment consists in the use of the alkaline spray, and the application of iodoform, aristol, cocain (10 per cent.), or menthol. The general treatment is that of tuberculosis.

8. In aneurysm of the descending aorta there may be pulsation and systolic murmur to the left of the spine; pressure symptoms appear on left bronchus, and there will be defective breathing on that side; left vocal cord may become paralyzed, left pupil may be dilated, emaciation may occur from pressure on thoracic duct.

9. Cause of influenza is Pfeiffer's bacillus. Symptoms are chilliness, sneezing, nasal discharge, great pain in head, back, and chest; cough, expectoration, prostration, fever, rapid pulse and respiration and gastro-intestinal disturbances. Diagnosis is made by the symptoms and history of an epidemic.

10. *Cholera infantum:* An acute infectious disease occurring in children under two years of age, closely resembling Asiatic cholera. It is a severe form of gastrointestinal infection, due to the toxins of the bacteria in milk. It occurs in hot weather among the poor in large cities. *Symptoms:* Diarrhea is the initial symptom. The stools are more or less fecal, but soon become watery, colorless, and odorless. In some cases they may be of a brownish-green color with a musty odor. There are restlessness, high fever (105-108° F.), thirst, vomiting, and purging. The child rapidly wastes, and the surface temperature fails. The urine is scanty or suppressed, and the child becomes apathetic, which condition may pass on to convulsions, stupor, and death. *Treatment:* Ordinary diarrhea should be prevented from terminating in cholera infantum. The stomach and colon should be irrigated. From ℥2-4 of water at 100° F. should be allowed to flow into the stomach through a soft-rubber catheter and be siphoned out. This should be done only once. For the colon, soda bicarbonate, ℥1, should be added to the pint, and the irrigation performed twice daily. If the rectal temperature is very high ice-cold water should be used; otherwise warm water. When symptoms of collapse appear hot pack is used. Ice-water quenches the thirst, even if it is vomited. Champagne and drop-doses of brandy may be given if the stomach is tolerant. Strychnine, gr. 1/100-1/48, hypodermically, to a child one year old, is a valuable stimulant. Morphine, gr. 1/100, and atropin, gr. 1/800, may be given in the same way and repeated every hour until the child is quieted. The course is short, and the prognosis is grave.

Enterocolitis and bronchopneumonia often follow. During convalescence barley-water, acacia-water, etc., may be given.—(*Pocket Cyclopedia.*)

OBSTETRICS.

1. Asphyxiation may result. "If such a coil be felt, it should be drawn down between the fingers, and, if loose enough, slipped over the child's head; but if the cord be too tightly applied to permit of this procedure, and the head appears congested and suffused, the former should be seized and cut between two artery clamps, and the child immediately extracted."—(Williams.)

2. Symptoms of death of fetus are: cessation of the signs of pregnancy, the abdomen and uterus are both diminished in size, the fetal heart sounds and movements are absent, there is no pulsation in the cord, the mother's breasts become flaccid and occasionally secrete milk. If the fetus has been dead for some time crepitus of its cranial bones may be elicited.

3. Pallor, air hunger, shock, collapse, cyanosis, uterine contractions weak or absent.

4. *The different displacements of the uterus* are: Retroversion, retroflexion, anteversion, anteflexion, lateral version, lateral flexion, descent, prolapse, ascent, and mallocation (to front, back, or one side).

General treatment consists in: Removal of cause (when possible), reposition, retaining in position by tampons or pessaries, breaking up of adhesions, various operations (according to the conditions present).

5. CYSTITIS. *Symptoms:* Frequent urination, with tenesmus and a burning sensation in the urethra; later on pain in the bladder, hematuria, and the urine contains pus and epithelial cells. Chills, rapid pulse, fever, and headache may also be present. *Treatment:* Rest in bed; the imbibition of plenty of milk and water, and the avoidance of all highly seasoned food; laxatives; diuretics; sitz bath; irrigation of the bladder with an antiseptic solution; hot fomentation and vaginal douches are often helpful; sometimes intravesical medication is necessary.

6. PLACENTA PRÆVIA. *Treatment before term:* Rest in bed, with or without a *tampon,* will arrest hemorrhage for the time; the sinuses are closed by thrombi, and the case may go on to term or another hemorrhage. The patient should be allowed cold drinks; opium may be used where pain is present. If the hemorrhage is great, it is safer to induce labor at once than to wait. Occasionally no hemorrhage occurs during pregnancy, not even in labor. *Treamtent at term:* (1) Introduce one or two fingers within the os (the hand being in the vagina) and dissect the placenta from the uterine wall for about three inches

from the os uteri in all directions, pushing it to one side if necessary. (2) Rupture the membranes, and if there is an unfavorable presentation, turn the child and make the breech engage in the os; or, if the head presents, the forceps may be used, if speedy delivery is necessary. The strength of the woman is then the main point to be cared for, and if in a reasonable time the uterus seems to be incompetent, the child may be delivered by art. In some cases of central placenta prævia, where rapid delivery is required, cesarean section may give good results for mother and child.—(Landis' *Obstetrics.*)

7. The sutures and fontanelles.

8. *Management of a breech presentation:* "As a rule, it should not be interfered with until the breech is born. The physician should then: (1) As soon as the hips are delivered, draw down a loop of the cord, as otherwise it may be compressed between the child's head and the pelvic brim during the descent of the former, and, not being able to pass down as rapidly as is required, it may be torn off at the umbilicus or so stretched as to interfere with the placental circulation. If the cord is pulsating strongly, place the loop thus drawn down out of the way in the postero-lateral part of the pelvic excavation. If the pulsation is feeble or absent, hurry the delivery. (2) As the shoulders are coming down, endeavor to secure anterior rotation, if it is in a posterior position. (3) As soon as the body is born, bring down the arms, if extended. (4) If the head is not at once born, pass two fingers to its mouth, to secure a supply of air and to admit of respiration. (5) Draw the body down against and parallel to the perineum (to flex the head). Then elevate the body, turning it over on the mother's abdomen while making traction. An assistant, if possible, should press upon the hypogastrium, to force the head down. Repeat the maneuver, if necessary."—(Landis' *Obstetrics.*)

9. *Puerperal eclampsia* is an acute morbid condition occurring during pregnancy, labor, or the puerperal state, and is characterized by tonic and clonic convulsions, which affect first the voluntary and then the involuntary muscles; there is total loss of consciousness, which tends either to coma or to sleep, and the condition may terminate in recovery or death. *Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:*

(1) Control the convulsions (by chloroform, veratrum, or chloral); (2) eliminate the poison or poisons which are presumed to cause the convulsions; (3) empty the uterus under deep anesthesia by some method that is rapid and that will cause as little injury to the woman as possible.

10. *Formation of placenta:* "During the rapid development of the chorion frondosum a corresponding change takes place in the decidua serotina; its tissues hypertrophy and become thick, spongy, and very vascular. The chorionic villi sink deeply into this pulpy mass and become intimately connected with it, so that separation can only be accomplished by actual tearing of the decidual substance. By the end of the third month the placenta is fully formed and is able to assume the functions for which it is destined. These *functions* are the supplying of nourishment from the mother to the fetus, the oxygenation of the impure fetal blood, and the excretion of the effete products from the fetus. It is probable that the placenta also possesses to a certain extent a glycogenic function. Any disturbance of these functions will result in disease or death of the fetus."—(Dorland's *Obstetrics.*)

SURGERY.

1. *Treatment of tuberculous sinuses:* "The treatment varies with the conditions present, and must include measures directed to the lesion from which the sinuses have originated. The extent and direction of any given sinus may be demonstrated by the use of the probe, or, more accurately, by injecting the sinus with a paste of bismuth and vaseline—subnitrate of bismuth, 30 parts; white vaseline, 60 parts; soft paraffin, 5 parts; wax, 5 parts—and following its track in an *x*-ray photograph. It has been found by Beck of Chicago that the injection of bismuth paste is frequently followed by healing of the sinus, and that, if one injection fails to bring about a cure, repeating the injections every second day may be successful. Iodoform suspended in glycerin may be employed in a similar manner. When these and other non-operative measures fail and the whole track of the sinus is accessible it should be laid open, scraped, and packed with gauze until it heals from the bottom."—(Thomson and Miles' *Manual of Surgery.*)

2. Hypodermodysis is the subcutaneous injection of saline solution of 0.6 per cent. strength. "The saline solution is conveyed into the cellular tissue through a large hypodermic needle, which should be sterilized by boiling, and then introduced into the connective tissue, being previously connected by a rubber tube with a reservoir containing warm sterilized salt solution. The usual situations for the introduction of the solution are the external portions of the thighs and the anterior and lateral portions of the

abdominal walls. As much as two or three pints of the solution are often introduced in this manner, with good results."—(Wharton's *Minor Surgery.*)

3. HIP-JOINT DISEASE. *Cause:* Tuberculosis. *Symptoms of first stage:* Night cries; lameness in the morning; a slight limp; tendency to become tired on slight exertion; wasting; spasm; pain; swelling and deformity (either real or apparent).

Symptoms of second stage: Abduction, limping, pain, which is worse at night, apparent lengthening of the limb, abscess, atrophy of thigh muscles, flexion of thigh, effusion into hip joint, and there may be crepitation in the joint.

Symptoms of third stage: Flexion, adduction, and shortening of the limb, the joint may be dislocated or ankylosed, or suppuration may occur.

Treatment: Rest, extension, plaster of Paris, aspiration, incision, excision. Proper hygiene and food are requisite.

4. Remove a tooth, drill a hole through its socket into the antrum, introduce a rubber tube and wash out the antrum, then drain.

5. INTERNAL HEMORRHOIDS. *The application of a ligature* is the operation most often performed. The patient is placed in the Sims position, and after the field of operation has been rendered aseptic, the sphincter is divided. The rectum is irrigated with a mercuric chloride solution, 1:5,000. A needle carrying a ligature is passed through the base of the tumor. The thread is cut and the ligature is firmly tied on each side. At least two-thirds of the pile should be excised by the scissors. Iodoform gauze is inserted, and a T-bandage is applied. Morphine (gr. ¼) is then given. The bowels should be moved on the third day.—(*Pocket Cyclopedia.*)

6. Lungs and pleura are pushed aside; dyspnea and hindered heart action are present: leucocytosis is present. Excise part of fourth or fifth costal cartilage, then incise and drain.

7. The *indications* for ligating the internal carotid artery are wounds and aneurysm. Special care must be taken when opening the sheath to avoid wounding the internal jugular vein, vagus, and cervical sympathetic nerves, and ascending pharyngeal artery. The needle should be passed from the side of the internal jugular and the pneumogastric. When the head is extended and the face turned to the opposite side, an incision carried from the angle of the jaw to the anterior border of the sterno-cleido-mastoid opposite the top of the thyroid cartilage will cross the artery obliquely. It must be carried through the skin, platysma, and subcutaneous cellular tissue, the external jugular being drawn aside when encountered. The superficial fascia is then divided in the line of the incision,

care being taken not to deviate to the right or left, and the deeper and denser layer then torn through with the director. When the artery has been exposed and cleaned, the needle is passed from behind forward.

8. "*Plastic surgery* includes operations for the repair of deficiencies, for the replacement of lost parts, for the restoration of function in parts tied down by scars, and for the correction of disfiguring projections. Many reparative operations have been devised. Among them are: cheiloplasty, or the construction of a new lip; the closure of a cleft in the palate, the lip, or the penis; the making of a new nose; skin-grafting, grafting of muscle or tendon; nerve-grafting; the introduction of celluloid or metal into the tissues to act as supports; the injection of paraffin into the tissues to amend a depression; the diminution in the size of a lip or a nose; the amendment of protuberant ears; the correction of distortion due to cicatrices; excision of scars; closure of congenital sinuses and of fistulæ; removal of disfiguring growths."—(Da Costa's *Surgery.*)

9. The focus of infection must be dealt with either by free incisions or amputation, but once the organisms reach the circulation this cannot be expected to do much good. Good food, stimulants and quinine must be given. Antistreptococcic serum should be tried, 10 c.c. every four hours. Intravenous injections of large quantities of saline solution frequently, to produce diuresis and diarrhea, with the hope of washing out the cocci and their products, may be tried.

10. Echinococcus cysts are hydatid cysts caused by echinococci (tapeworm of dog). Chiefly found in liver and lung. They may cause only pressure symptoms, or cause toxemia, or suppuration and abscess.

DERMATOLOGY, SYPHILOLOGY, AND DISEASES OF THE EYE, EAR, NOSE, AND THROAT.

1. *Tinea trichophytina* is a contagious parasitic affection characterized by the development of circumscribed patches or rings. It is also called *ringworm. Varieties:* Tinea trichophytina capitis, barbæ, corporis, unguium. *Treatment:* Washing, epilation (if on a hairy part), and the use of parasiticide applications.

2. *Psoriasis* is a common chronic inflammatory disease of the skin, characterized by variously sized lesions, having red bases covered with white scales resembling mother-of-pearl. It affects by preference the extensor surface of the body. The lesions are infiltrated, elevated, clearly defined, covered with white, shining, easily detachable scales which, upon removal, reveal a red, punctuate, bleeding surface. The eruption is absolutely dry, and itching is usually absent.

PSORIASIS.	ECZEMA SQUAMOSUM.
1. Predilection for elbows, knees, and scalp.	1. No seat of predilection.
2. Patches small, round, and sharply marginated.	2. Patches large, irregular, and ill defined.
3. Scales abundant, firmly attached, and mother-of-pearl in color.	3. Scales scanty, loosely attached, and grayish or yellowish in color.
4. Moisture never present.	4. Often history of antecedent moisture.
5. Itching slight, often absent.	5. Itching marked.
6. Disease often lasts with recurrent attacks throughout a lifetime.	6. More amenable to treatment.

(Schamberg.)

3. *Eczema* is an acute, subacute, or chronic, noncontagious inflammatory disease of the skin, characterized primarily by erythema, vesicles, papules, or pustules, and, secondarily, by scales and crusts, and accompanied by itching and burning. The various forms of eczema constitute about thirty per cent. of all skin diseases. There are several varieties corresponding to the most predominant lesion. These may continue as such or terminate in eczema rubrum or eczema squamosum. The diagnosis of eczema is, as a rule, easy. The most distinctive features are: (1) Serous exudation; (2) the gradual merging of the patches into the surrounding healthy skin; (3) polymorphism of the lesions; (4) the symmetry of the eruption; (5) the marked itching and burning.

ERYSIPELAS.	ECZEMA ERYTHEMATOSUM.
1. Sudden onset with chill and marked constitutional symptoms.	1. No constitutional symptoms.
2. Eruption sharply marginated.	2. Fades into surrounding skin.
3. Glazed, shining surface; great edema.	3. Dull, scaly surface; slight infiltration.
4. Color violaceous.	4. Color bright or dull red.
5. Burning pain.	5. Itching more marked.
6. Occurrence of discrete vesicles or blebs.	6. Vesicles occur in patches if at all.
7. Progressive peripheral spreading.	7. Spreading irregular.
8. Runs an acute course.	8. Runs a chronic course.
9. Contagious.	9. Not contagious.

(Schamberg.)

4. The initial lesion of syphilis is the chancre.

5. *Mucous patches* are symmetrical ulcers. Superficial and painless, gray in color, moist, with an offensive discharge; found usually on lips, palate, tongue, cheek, gums, scrotum, anus, prepuce, vagina, labia, vulva. They are generally circular or oval in shape, and belong to the secondary stage of syphilis.

6. *Astigmatism* is an error of refraction caused by some irregularity of the curvature of the refracting surfaces of the eye.

Causes: "Astigmatism is usually due to a change in the curvature of the cornea, with or without some shortening or lengthening of the antero-posterior diameter of the eyeball. It is also caused, in part at least, by defects in the curvature of the lens; this lenticular astigmatism may partly neutralize that of the cornea. It is usually congenital and there is often an hereditary tendency. It may, however, be acquired, and is then caused by corneal changes resulting from inflammation, injury, or operation. Pressure of the lids in ametropia is sometimes considered a factor in acquired regular astigmatism." (May.)

Astigmatism is corrected by cylinders, sphero-cylinders, or crossed cylinders. The curve of the corresponding cylinder corresponds to the ametropic meridian; consequently its axis is at right angles to this meridian.

7. *"Plastic iritis.* An inflammation of the iris in which a scant, fibrinous exudate is deposited on the anterior or posterior surface of the iris, the pigment layer at the edge of the pupil thereby becoming adherent in places to the capsule of the lens. The symptoms are intense pain in the forehead and face, lacrimation, photophobia, dimness of vision, pericorneal injection, loss of luster of the iris, and hazy, distorted, and immobile pupil. The course of the disease is from 2 to 4 weeks. Synechiæ often result, It is due to exposure to cold, syphilis, tuberculosis, rheumatism, etc., but may be secondary to other ocular inflammation, traumatism, foreign body, etc. The original cause should be treated by the administration of the iodides, salicylates, mercurials, etc. The instillation of atropine, dark glasses, and, if pain is severe, hot compresses, leeches to the temple, and morphine should be prescribed. The diet should be liquid. Puncture of the cornea to relieve tension may be necessary."

"Serous Iritis.—A chronic inflammation in which an inflammatory product, poor in cells, settles in the anterior chamber, causing a haziness of the aqueous, and deposits on the posterior surface of the cornea. Opacities on the posterior portion of the cornea and vitreous and lenticular opacities and posterior synechiæ often follow. This condition results from debility, anemia, syphilis, etc., and may

follow cataract operations. In addition to constitutional treatment, atropine should be instilled twice daily, and sometimes paracentesis and iridectomy may be indicated. Heat, diaphoresis, and the iodides will aid in the absorption of the exudate.

"*Suppurative Iritis.*—A rare condition in which the inflammatory product is purulent and saturates the tissues of the iris and overflows into the anterior chamber, forming a hypopyon. It results from infection or diabetes."
(Gould and Pyle's *Pocket Cyclopedia.*)

8. *Acute catarrhal laryngitis* may result from atmospheric changes, exposure to cold and wet, immoderate use of the voice, inhalations of dust or chemicals, traumatism, and indirectly from tuberculosis, rheumatism, etc.

The symptoms are hoarseness, cough, expectoration of a viscid secretion, dryness of the throat, and pain on deglutition. In children the respiration may be embarrassed and paroxysms of croup may occur.

The treatment consists in the administration of fractional doses of calomel (gr. ¼) followed by a saline purge. Hot foot-baths and free diaphoresis by hot drinks with quinin (gr. 5) and Dover's powder are beneficial. The diet should be light. Potassium citrate solution with 1-drop or 2-drop doses of tincture of aconite is serviceable. Cold may be applied locally, and inhalations containing menthol. chloroform, and compound tincture of benzoin are valuable. Boroglycerid may be used locally. In children, syrup of ipecac (3 ½) may be administered every 15 minutes until vomiting occurs."—(*Pocket Cyclopedia.*)

9. Suppurative otitis media generally follows an acute otitis, and is due to the passage of pathogenic germs from the nasopharynx into the middle ear. The pain is intense, hearing is dull, tinnitus more distressing, and there is usually fever; an offensive discharge may ensue. Dangers are: Perforation, deafness, sepsis, necrosis of ossicles.

10. *Causes of nose-bleed:* Trauma, ulceration, tumors, rupture of varicose vein, violent sneezing or blowing the nose, foreign bodies, vascular congestion, purpura, hemophilia, scurvy, nephritis. *To arrest epistaxis:* (1) Try to cauterize the bleeding point; (2) plug the nasal cavity with gauze soaked in adrenalin; (3) inject into the nares a solution of peroxide of hydrogen; (4) plugging the nares, anteriorly and posteriorly; (5) an inflating plug may be used.

STATE BOARD EXAMINATION QUESTIONS.

PENNSYLVANIA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Describe the shoulder joint.
2. Describe the appendix vermiformis and give its relations.
3. Describe the prostate gland and give its relations.
4. Name the structures within the female pelvis and give their relations.
5. Describe the "anatomy" involved in an operation for the radical cure of oblique inguinal hernia.
6. Describe the tibia and give in detail its articulations.
7. Describe the fascia lata and give its regional anatomy.
8. Describe the female perineum and the relations of its muscles and fasciæ.
9. Describe the gross anatomy of the stomach and give its relations.
10. Describe the distribution of the peritoneum.

PHYSIOLOGY.

1. Describe three functions of adipose tissue.
2. Describe the functions of the Haversian canals.
3. What changes take place in the circulation after the ligation of an artery?
4. Describe the mechanism of vision.
5. State the functions respectively of the renal glomerular and tubular epithelium.

PATHOLOGY.

1. Describe the physical changes characterizing lesions of the cardiac valves and the effects of such changes upon the "sounds of the heart."
2. Define: Hyperemia, hypertrophy, hyperplasia and hypoplasia.
3. Give a brief outline of the pathologic changes that occur in the various types of peritonitis.
4. Name the immediate and remote pathologic conditions that may result from gonococcus infection.
5. Describe the renal changes occurring in cirrhotic kidney.

PRACTICE AND THERAPEUTICS.

1. What are the symptoms and signs of acute dilatation of the heart?
2. Describe the symptoms of intestinal perforation in typhoid fever.
3. What are the symptoms and characteristic course of a case of erysipelas?

4. How would you treat a case of suppression of urine due to acute Bright's disease?
5. What are the symptoms and treatment of poisoning by chloral hydrate?
6. Outline the dietetic, medicinal, and hygienic management of a case of typhoid fever.
7. Describe the prophylactic and curative treatment of a case of ophthalmia neonatorum.
8. How would you treat a case of ivy (rhus toxicodendron) poisoning?
9. Outline symptoms and course of a case of tabes dorsalis (locomotor ataxia).
10. What are the characteristic features of a case of psoriasis?

SURGERY.

1. Give the symptoms of and describe an operation for the correction of movable kidney.
2. Describe the indications and the technic for paracentesis of the membrana tympani.
3. Describe in detail two methods for the reduction of a dislocation of the shoulder joint.
4. Describe three methods for the radical cure of hemorrhoids with reasons for the employment of each method.
5. Give the more common symptoms of chronic appendicitis and state the symptoms that indicate extreme urgency for operation.
6. Outline the surgical treatment of gunshot wounds of the abdomen.
7. Describe in detail the application of two methods of the non-operative treatment of epithelioma of the skin.
8. Describe the surgical treatment of the various types of stricture in the male urethra.
9. Give the symptoms requiring curetage of the uterus and describe in detail the technic of the operation.
10. Name the complication that may arise from undescended testes and describe an operation for its correction.

OBSTETRICS.

1. Describe methods to determine the position of the fetus previous to labor.
2. State the normal pelvic measurements and describe the methods of determining the same.
3. State the dangers to the cord in the various stages of labor and describe the methods of overcoming these dangers.
4. For what conditions and at what period of time should cesarean section be performed?
5. Describe the proper attention to a newly born babe.

6. Describe the proper preparation of the lying-in room and bed.
7. Name four causes of dystocia, with the treatment of any one form.
8. Describe the delivery in a case of breech presentation requiring the application of forceps.
9. Define involution. State causes of delayed involution and subinvolution.
10. Give management of a case with occiput in the hollow of the sacrum.

CHEMISTRY.

1. Describe a test for the detection of free hydrochloric acid in the gastric contents.
2. Describe a chemical test respectively for chlorids, urates, earthly phosphates.
3. How can the presence of sewage in water be chemically detected?
4. When testing for glycosuria with a copper solution, how do you determine whether the reaction is that of "sugar" or of some other reducing agent?
5. Give a chemical test for the presence of indican in the urine.

MATERIA MEDICA.

1. (*a*) Give the official title of digitalis. (*b*) Give the names and doses of its preparations.
2. What are the doses of the following drugs? (*a*) Codeinæ sulphas. (*b*) Atropiæ sulphas. (*c*) Hyoscin hydrobromidum. (*d*) Cocain hydrochloricum.
3. Name the preparations of ergot. Give the dose of each.
4. Give an example of an official preparation belonging to the following classes: (*a*) Tonics. (*b*) Stimulants. (*c*) Emetics. (*d*) Astringents.
5. Name two alkaloids obtained from each of the following drugs: (*a*) Nux vomica. (*b*) Cinchona. (*c*) Opium.

DIAGNOSIS.

1. Differentiate infantile scurvy and infantile rheumatism.
2. Differentiate apoplexy from conditions that simulate it.
3. Differentiate duodenal ulcer from conditions that simulate it.
4. Differentiate appendicitis, cholecystitis, salpingitis, and intestinal obstruction.
5. Diagnosticate iritis.

HYGIENE.

1. Give dietetic and hygienic treatment of "scarlet fever."
2. Outline dietetic and hygienic care in acute nephritis.

3. Name two of the most infectious and contagious diseases contracted in schools, and state how you would endeavor to prevent them.

4. What are the most frequent defects of vision in school children? What care and treatment should they receive?

5. Outline hygienic and dietetic care of pulmonary tuberculosis.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

PENNSYLVANIA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *shoulder-joint* is an enarthrodial joint, formed above by the glenoid cavity of the scapula and below by the head of the humerus. Its ligaments are: Glenoid, coraco-humeral, and capsular. The glenoid surrounds the edge, deepens the glenoid cavity, and is continuous above with the long head of the biceps tendon. The capsular ligament, extensive and loose, arises above from circumference of glenoid cavity behind the ligament, is attached below to the anatomical neck of humerus, and is pierced by tendons of two or three muscles. The coraco-humeral, or accessory, is a fibrous band which extends obliquely downward and outward from the coracoid process to the anterior part of great tuberosity, strengthening the capsular ligament.

2. *Vermiform appendix:* A small, blind tube, generally hollow to tip, its lumen continuous with that of cæcum and sometimes guarded by valve. Average length, 3¾ inches; diameter, about ¼ inch at base, 3/16 inch at apex. Origin, generally arises about ¾ inch below ileo-cecal valve, upon its inner and posterior aspect—but sometimes forms the true apex of cæcum. *Course:* Variable—(1) According to Treves, the appendix generally passes upward from behind cecum toward spleen, lying behind lower end of ileum and its mesentery. *Relations to peritoneum:* Mesentery always present but not extending to tip—about distal third being entirely enveloped in peritoneum and free. Meso-appendix, of triangular form—derived from left leaf of mesentery—containing, in its free margin, posterior branch of ileo-cecal artery (from ileo-colic). *Relations to cecum:* Four types of cecum occur (Treves)—(*a*) appendix arising from apex of cecum; (*b*) appendix arising between two sacculi of equal size; (*c*) appendix arising between two sacculi of unequal size (about 90 per cent. of cases); (*d*) appendix appearing to arise from ileo-colic junction. *Relations to anterior abdominal wall:* According to McBurney, draw straight line from anterior superior iliac spine to umbilicus, and beneath this line, from 1½ to 2 inches, in-

ternal to the spine, the base of the appendix is found (in right iliac fossa.)—(Bickham's *Operative Surgery.*)

3. The *prostate gland* adjoins the neck of the bladder and surrounds the first part of the urethra. It is said to resemble a horse-chestnut in shape, with the apex directed downwards. It measures about 1½ inches across its base and 1¼ inches in depth, and 1 inch from before backwards, and is held in position by the anterior true ligaments of the bladder.

The gland consists of three lobes, two lateral and one middle, and is perforated from base to apex by the urethra. The common seminal ducts open into the prostatic portion of the urethra, and are placed between the middle and lateral lobes.

RELATIONS. *Anteriorly:* Symphysis pubis, anterior ligaments of bladder, branches of dorsal vein of penis. *Posteriorly:* Rectum. *Laterally:* Levator ani. *Base:* Surrounds neck of bladder, seminal vesicles, and vasa deferentia. The *apex* rests on triangular ligament.

4. Ureters, bladder, part of the small intestine, rectum, uterus, ovaries, Fallopian tubes, vagina.

5. In oblique inguinal hernia the neck of the sac is to the outer side of the deep epigastric artery. As the hernia increases it escapes from the external abdominal ring, and descends into the scrotum or labium majus (scrotal or labial hernia). The coverings of this hernia are the following: The skin, the superficial fascia, the intercolumnar fascia, the cremaster muscle, the infundibuliform fascia, the subserous tissue, and the peritoneum.

6. *Tibia* is the shin bone, or internal bone of the leg, and extends from knee to ankle. It consists of a shaft and upper and lower extremities. The shaft is triangular and prismatic in shape; its anterior border is subcutaneous and forms the shin; on the posterior surface is an oblique line. The upper extremity is expanded, and presents the head, with two tuberosities, spinous process, tubercle, and popliteal notch. The lower extremity is quadrilateral, and from it projects the internal malleolus. It articulates above with the femur; with the fibula at top and bottom, and below with the astragalus. It has three points of ossification, one each for shaft, and upper and lower extremities.

7. *Fascia lata* of the thigh envelops the muscles and surrounds the limb. Above it is attached to the back of the sacrum and coccyx, to the iliac crest, to Poupart's ligament, pubic body and ramus, ischial tuberosity and ramus, and to the lower edge of the great sacro-sciatic ligament. The *ilio-tibial band* is a thickened part attached above to the iliac crest and below to the head of the fibula and outer tuberosity of the tibia. The fascia lata is attached below to the head of the tibia and sides of the patella, being

strengthened by aponeuroses from the vasti muscles. Behind the fascia passes across between the hamstring muscles, enclosing the popliteal space.—(*Aids to Anatomy.*)

8. The perineal body is a wedge-shaped mass situated between the posterior border of the vulva and the anterior border of the anus. It forms a wedge, and is composed of muscles, areolar tissue, fat, nerves, and vessels. The important muscles are the two deep transversus perinei, levatores ani, which meet in the upper portion of the median line of the perineum and are attached to the pubic ramus of each side. They extend about two-thirds up the posterior vaginal wall, and encircle the posterior half of the canal.—(Thomas and Mundé.)

Superficial perineal fascia consists of superficial fat layer and deep membranous layer. The former is continuous with subcutaneous layer of buttocks, thigh, and labia, and posterior to anus become continuous with tissue of ischio-rectal fossa. The *superior layer* passes from rami of pubis and ischium to the tuberosity of ischia, covering ischio-cavernous and bulbo-urethral muscles, and becomes continuous with the deep perineal fascia.

The *deep perineal fascia* (triangular ligament) is a strong triangular membrane extending between the rami ischii et pubis, its apex attached to the under surface of the symphysis. It is often described as consisting of two layers, the anterior and posterior (superior and inferior). It is pierced by the urethra, and it is continuous with the fascia of the vagina.

9. STOMACH is conical, with base to left side; the upper border is concave, and is called the *lesser* curvature; the lower border is convex, and is named the *greater* curvature. The left extremity is known as the *fundus;* above and to the right of which is the *cardiac* orifice, and the right or small end is termed the *pyloric* extremity. It occupies left hypochondriac and epigastric regions. Its *orifices are cardiac,* above, communicating with the esophagus; *pyloric,* at the right extremity, passing into the duodenum. It is 10 to 12 inches long, 4 to 5 inches in diameter at widest part. Its *left* or *cardiac end* is fixed by esophagus and gastrophrenic ligament to diaphragm, lying beneath the seventh left costal cartilage, 1 inch from sternum; it is connected with the spleen by the gastrosplenic omentum. The *right* or *pyloric end* reaches the gall-bladder, touching under part of quadrate lobe of liver; is very movable; when stomach is empty is in midline 4 inches below tip of gladiolus. *Anterior surface,* which also looks upward, is in contact with, from left to right, diaphragm, abdominal parietes (epigastric region), under surface of liver. *Posterior surface* is separated from pancreas, crura of diaphragm, aorta, vena cava inferior, and solar plexus,

by lesser sac of peritoneum. *Superior border* is attached to liver by small omentum. *Inferior border* gives attachment to great omentum. *Coronary* and *pyloric* arteries run along lesser curvature; *right* and *left gastroepiploic,* along inferior or greater curvature; *vasa brevia,* from the splenic to fundus. *Right pneumogastric* nerve supplies to posterior surface; *left pneumogastric,* the anterior surface; *sympathetic,* from the solar plexus, both surfaces.—(*Aids to Anatomy.*)

10. *Peritoneum. Course of, forming greater sac; in longitudinal section.*—"Passing down from the umbilicus, the peritoneum lines the anterior abdominal wall—covers the urachus and obliterated hypogastric arteries—passes onto the bladder, from its upper aspect to the trigone—is reflected onto the anterior and upper part of the lateral aspects of the rectum, in the male, forming the recto-vesical pouch. In the female, the reflection is from the bladder onto the uterus (utero-vesical fold)—extending thence over the upper portion of the posterior vaginal wall—and thence to the rectum (recto-vaginal pouch). From the rectum, the sigmoid flexure of the colon is entirely covered (sigmoid mesocolon)—the ascending and descending colons being covered, generally, only anteriorly and laterally—and passing from the spine downward, the peritoneum covers the small intestines, forming the lower leaf of the mesentery—and thence back again, completing the investment of the small bowel, forming the upper leaf of the mesentery—and passes backward over the transverse portion of the duodenum to the pancreas—thence forward to form the inferior layer of the transverse mesocolon—covers the inferior and part of the anterior aspect of the transverse colon—thence runs downward to form the posterior layer of the great omentum—returning to form the anterior layer of the great omentum—thence to the stomach, covering its antero-superior aspect—thence to the under surface of the liver, forming the anterior layer of the lesser or gastro-hepatic omentum—thence covers the inferior surface of the liver, from the transverse fissure to its anterior border—whence it is reflected over the anterior border to cover the superior surface of the liver to the posterior peritoneal limit—thence it passes to the inferior concave surface of the diaphragm (superior layer of the coronary ligament)—thence over the anterior portion of the concavity of the diaphragm to the anterior abdominal wall—whence it passes down the anterior abdominal parietes to the umbilicus, to the place of beginning.

Course of the Peritoneum Forming the Lesser Sac—In Longitudinal Section.—"Beginning at the posterior aspect of the stomach, which it covers, the peritoneum of the

lesser sac passes upward to the inferior surface of the liver, behind the transverse fissure, forming the posterior layer of the lesser or gastro-hepatic omentum—and having covered the postero-inferior aspect of the liver, it passes on to the under surface of the diaphragm (inferior layer of the coronary ligament)—thence passes downward over the posterior portion of the concavity of the diaphragm to the spine, covering the great vessels—thence to the pancreas—thence forward, forming the upper layer of the transverse mesocolon—covers the supero-anterior aspect of the transverse colon—descends, forming the innermost layer of the great omentum—then ascends to the greater curvature of the stomach—and covers its posterior wall, to the place of beginning. The lesser sac is in relation with the inner aspect of the spleen, forming the inner layer of the gastro-splenic omentum—and also in relation with the superior portion of the left kidney."—(Bickham's *Operative Surgery.*)

PHYSIOLOGY.

1. ***Three functions of adipose tissue:*** (1) It is a reserve store of food; (2) protection of delicate structures; (3) it preserves the heat of the body.

2. ***The Haversian canals*** serve to conduct arteries, veins, lymphatics, and nerves to and from the bone substance.

3. After ligation of an artery the inner and middle coats curl up and retract, a small thrombus forms, which later on is replaced by fibrous tissue. The vessel is thus obliterated and a new or collateral circulation is established. The ligature of a large artery is followed by a rise in the general blood-pressure, which decreases as the collateral circulation is established.

4.

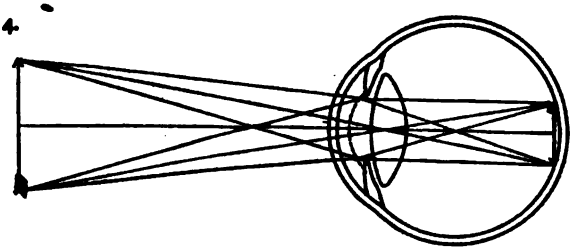


Diagram of the method of the formation of an inverted image exactly focused upon the Retina. The dotted line is the ideal surface of curvature.

5. The ***glomerular epithelium*** of the kidney is responsible for the fluid and inorganic salts of the urine; the ***tubular epithelium*** for the urea, uric acid, and principal solids.

PATHOLOGY.

1. Each valve may be affected in one of three ways; it may be narrowed, impeding the flow of blood, or stenosed; it may be incompetent, regurgitation; it may be both obstructed and incompetent. In mitral regurgitation a systolic murmur is heard at the apex and is transmitted to the axilla or the back, the pulmonary second sound is accentuated. In mitral stenosis a rough presystolic murmur is heard at the apex. In aortic regurgitation a diastolic murmur is heard at the aortic cartilage and is transmitted down the sterum. In aortic stenosis a systolic murmur is heard at the aortic cartilage and is transmitted to the vessels of the neck.

2. *Hyperemia* is a condition characterized by excess of blood in a part. *Hypertrophy* is "an increase in the size, weight, and functional activity of a part beyond the limit of health, due to an orderly enlargement or multiplication of all its normal constituents."

Hyperplasia is a numerical hypertrophy; that is, an hypertrophy in which there is a numerical increase in the cells of the part.

Hypoplasia is a condition in which there is atrophy of a part due to the destruction of some of its cells.

3. *Peritonitis.*—"In the *acute form* the membrane is hyperemic, and there may be scattered extravasations of blood from rupture of the distended capillaries. The secretion is arrested and the peritoneum becomes dry, lusterless, and opaque. The inflammatory exudate may be serofibrinous, fibrinous, or purulent. The serous or serofibrinous exudation is productive of more or less ascites. As the fluid is absorbed the fibrinous portions remain behind and become organized, giving rise to adhesions between opposing surfaces. If the inflammation subsides in the early stage, or if the fibrin is in excess from the beginning, adhesions form without ascites. These adhesions may serve to wall off any localized purulent exudation, thereby converting it into an abscess. The inflammatory process may be diffused or circumscribed.

"In the *chronic form* the peritoneum is thickened and studded with tuberculous or cancerous nodules, as the case may be. Adhesions are present and serve to mat the intestines together, and to disturb the relations of the abdominal viscera. There is a varying quantity of fluid in the cavity, which is albuminous, but may, at times, be bloody. The omentum is greatly thickened and shrunken."—(Hughes' *Practice of Medicine.*)

4. Arthritis, bursitis, edema, inflammation, ankylosis, endocarditis, pericarditis, pleurisy, iritis, urethritis, prostatitis, cowperitis, epididymitis, orchitis, cystitis, nephritis,

vulvitis, vaginitis, bartholinitis, endocervicitis, endometritis, salpingitis, pyosalpinx, ovaritis, and peritonitis.

5. The kidney is diminished, the capsule is thickened and adherent, the surface is uneven and granulated, the tissue between the granulations is paler, cysts may be present, cortex is atrophied, the interstitial tissue is much increased chiefly around the Malpighian bodies, the walls of the blood vessels are thickened, and the lumen diminished, capillaries are obliterated, the tubules are flattened and show signs of degeneration.

PRACTICE AND THERAPEUTICS.

1. In *cardiac dilatation:* "The symptoms are those of *failing circulation;* precordial anxiety, palpitation, headache, vertigo, syncope, pallor, cough, dyspnea, venous congestion and dropsy. The cardiac *impulse* is feeble and diffused, and usually displaced to the left. The area of cardiac *percussion-dullness* is increased. The *first sound* is weakened in correspondence with the disproportion between the enlargement of the cardiac chambers and the thickness of their walls; the *second* is little changed. If the dilatation has been great enough to so enlarge the orifices or weaken the muscles that the valves are no longer competent to effect complete closure, regurgitant murmurs may be developed, even in the absence of structural alterations in the valves. Such murmurs are usually rather soft and may be inconstant. The *action* of the heart may be rapid and irregular. The *pulse* is small and soft."

2. Sudden and severe abdominal pain, rigidity of the abdominal wall, chill, nausea, vomiting, collapse, anxiety, hiccough, perspiration.

3. *Erysipelas.* "Prodromes are sometimes present, and consist of slight fever, chilliness, malaise, tingling of the part to be affected, and sometimes enlargement of neighboring lymphatic glands. In many cases the disease is ushered in suddenly with a chill, followed by pain in the head and limbs and a high, irregular fever. The temperature may reach 103° or 104° in twelve or twenty-four hours. The pulse is full and rapid; the tongue is heavily coated; the appetite is lost; the bowels are constipated; and the urine is scanty and often slightly albuminous. The inflammation usually begins in the neighborhood of the nose, and spreads upward and laterally over the head to the neck, where it frequently stops. The affected part has a crimson hue; it is swollen and tense, and frequently ends in a sharply-defined ridge, beyond which, however, projections can be felt advancing into the subcutaneous tissue. The surface of the inflamed patch is at first smooth and glazed, but later it is covered with minute vesicles or

blebs. The patient complains of burning and tingling; the surrounding parts are extremely edematous, so that the features may be scarcely recognizable. In four or five days the redness begins to fade and the swelling to subside; desquamation follows; the general symptoms improve; and the fever falls by crisis. The average duration is from a week to ten days. Relapses are extremely common." (Stevens' *Practice of Medicine.*)

4. Hot applications to the loins, free purgation and sweating; pilocarpine; salt should be omitted from the diet, the colon may be irrigated.

5. POISONING BY CHLORAL HYDRATE. *Symptoms:* Deep sleep, with the vessels of the head and neck greatly congested, accelerated pulse, widely dilated pupils, and deep though irregular respiration. Later the face becomes blanched and livid, the pupils contracted, the circulation and respiration fail, and the temperature falls. In some cases death occurs in from one-quarter to one hour in a condition of collapse. The usual fatal period is 8 to 10 hours.

Treatment: Stomach tube. Artificial respiration, flagellation, faradism. No chemical antidote is known. (Witthaus' *Essentials of Chemistry.*)

6. *Typhoid.* "On account of the wide distribution of the bacilli in the secretions, it is highly important that the excreta and all substances which come in contact with the patient should be thoroughly disinfected to prevent dissemination of the disease. The general treatment consists in absolute rest in bed with the enforced use of the bed-pan. The diet should be liquid, largely milk, and should be administered every 3 hours. Fever should be controlled by sponging, by the wet pack, and by the full bath. The Brand method consists in immersion of the body in a tub of water (70° F.) for 15 or 20 minutes every third hour when the temperature rises above 102.5° F. The medicinal treatment includes the use of antipyretics, intestinal antiseptics, and anti-typhoid serum. Abdominal pain, tympanites, and tenderness are best treated with fomentations and turpentine stupes, while meteorism may be relieved by the internal administration of turpentine and by the use of the rectal tube or injections of the milk of asafetida (℥ 5-6). Diarrhea, when it exceeds 4 or 5 stools daily, will require the withholding of all food except milk and the administration of opium, bismuth, codein, naphthalin, etc. Constipation should be relieved every 2 days by enemas containing soapsuds. When hemorrhage occurs, the foot of the bed should be elevated, an ice-bag or iced cloth should be applied to the abdomen, morphine should be given hypodermically, and opium (gr. 1) should be administered by the mouth every 3 hours. Peritonitis

usually terminates fatally, and requires the same treatment as hemorrhage. Abdominal section should be performed as soon as the diagnosis is positive. Alcohol, ammonia, strychnin, digitalis, etc., should be used if heart failure supervenes. Nervous symptoms are greatly lessened by hydrotherapy, but nerve sedatives may be necessary. Sore mouth may be prevented by cleanliness and the use of carbolizd glycerin solution (.05 per cent.) upon the gums and teeth.—(*Pocket Cyclopedia.*)

7. OPHTHALMIA NEONATORM. *Propyhlaxis:* Whenever there is the possibility of infection, or in every case, wash the eyelids of the newborn child with clean warm water, and drop on the cornea of each eye one drop of a 1 per cent. solution of nitrate of silver, immediately after birth. *Treatment:* Wash the eyes carefully every half hour with a saturated solution of boric acid; pus must not be allowed to accumulate. Two drops of a 2 per cent. solution of nitrate of silver must also be dropped on to the cornea every night and morning. The eyes must be covered with a light, cold, wet compress. The patient must be isolated, and all cloths and compresses used must be burned.

8. *Treatment of ivy poisoning:* "Sedative lotions are most efficacious in subduing the inflammation. One of the most soothing is a saturated aqueous solution of boric acid containing ten minims of glycerin to the ounce. Sodium hyposulphite solution (3i to the ounce), dilute fluid extract of grindelia robusta (3i to 4 ounces of water), and lotio nigra and lime-water are also very beneficial. The itching may be relieved by the addition of carbolic acid (10 minims to the ounce) and glycerin (10 minims) to any of the preparations. The great danger lies in overtreating, in an effort to allay the itching and burning." (Hughes' *Practice of Medicine.*)

9. *Tabes dorsalis.* A disease of the nervous system characterized by sclerosis of the posterior columns of the spinal cord. The affection is most frequently seen in men past middle life and may be due to syphilis, exposure to cold and wet, traumatism, excesses, and infectious and toxic processes. *The symptoms* are motor incoordination, staggering gait, inability to walk in the dark or with the eyes closed, paroxysms of shooting pains in the thighs, various crises neuralgic in character, a feeling of constriction about the waist, alterations of sensations, absence of knee-jerks, Argyll-Robertson pupil, various optic and trophic phenomena, etc. The condition is incurable and may last for several years.

10. "*Psoriasis* begins as small, reddish spots of the size of a pin's head, which immediately become covered with scanty or abundant whitish or grayish imbricated scales.

The spots gradually increase in diameter by peripheral extension, forming patches of various sizes and shapes. If an attempt be made to detach one of the scales by means of the finger-nail, it will be found to adhere quite firmly to the skin, and to be about the thickness of a cardboard. If the reddish patch thus made bare be pinched up between the finger and thumb, and compared with a similar pinch of the healthy skin, its inflammatory thickening will be discerned. A punctate hemorrhage often follows removal of the scales by scratching. *There is no watery discharge at any time.* The skin between the patches is perfectly healthy. Any portion of the body is liable to be attacked with psoriasis, but the elbows, knees, and scalp are involved with greatest frequency. The only discomfort the patient suffers is from the itching, which at times is very severe and distressing. The disease is essentially chronic. Few cases become permanently cured, but the affection shows spontaneous improvement in the summer months in many cases. The eruption may partially or completely disappear with or without treatment, but recurrence is to be expected." (Hughes' *Practice of Medicine.*)

SURGERY.

1. *Symptoms:* Weight in loins, dragging pain, acute crises, dyspepsia, dilatation of stomach, jaundice, albuminuria, hysteria, neurasthenia, melancholia. *Nephropexy.* The simplest method consists in passing three silk sutures through the lips of the wound and the kidney parenchyma, one at the upper, one in the middle, and one at the lower end; the sutures are tied after the wound is closed. Some surgeons remove the capsule from the posterior surface of the kidney before passing the sutures, in order to make a raw surface. *Edebohls* delivers the kidney through the wound, excises the fatty capsule, makes an incision through the fibrous capsule along the convex border of the kidney, turns the capsule back towards the pelvis, and passes sutures through the capsule. The kidney is reduced, and the sutures passed from within outwards through the muscles and tied. The wound is then closed.

2. *Indications* for paracentesis of the membrana tympani: In some cases of otitis media, for drainage, to deplete the parts, or for exploratory purposes. The incision is made from just behind and slightly above the handle of the malleus, downwards and backwards.

3. *Reduction of dislocated shoulder. Kocher's Method:* The forearm is flexed and the elbow pressed to the side; the arm is then fully rotated outwards. The arm is now brought forwards and upwards to a right angle with the body, and then rotated inwards, while the elbow is brought

down over the body so that the fingers sweep the opposite shoulder. These movements relax in turn the tense parts of the capsule, and bring the head of the bone down to the rent, and then through it back into the joint. *Extension:* The patient is placed flat on a mattress on the floor, while the surgeon firmly grasps the arm and places his unbooted foot in the axilla. Traction is then applied till the contraction of the muscles is overcome and the bone slips back into its socket. Outward or upward traction may also be used.

4. *Ligation* is easy, safe, and sure. The hemorrhoid is picked up with forceps and an incision made through the mucous membrane around the pile; the base is then transfixed with a double silk ligature, which is tied on either side, and the mass cut away. *Operation by the clamp and cautery* is favored by many surgeons. The pile is caught with forceps, and a Smith's clamp, the blades of which, in order to prevent burning, are covered with ivory on the side which rests against the mucous membrane, applied to the base of the pile, in the long axis of the rectum. The pile is then removed with scissors, and the base seared with the cautery at a dull red heat, after which the clamp is removed. *Whitehead's operation* consists in removal of the entire pile bearing area, and is indicated when there are masses of varicose veins which occupy the whole of this region. A circular incision is made at the junction of the skin and mucous membrane; the tube of mucous membrane containing the varicose veins is then dissected up and amputated, and the divided mucous membrane sutured to the skin. Stricture and incontinence occasionally follow this operation.—(Stewart's *Surgery.*)

5. *Common symptoms of chronic appendicitis:* Anemia, loss of flesh, general ill health, chronic dyspepsia, and irregularities of the bowels. *Operation is urgently indicated:* When there is no improvement after 36 hours; if the appendix remains tender and there is a rise of temperature at night; when severe pain, collapse, vomiting, abdominal rigidity are present; when fluctuation or beginning edema of the abdominal wall is present.

6. "The *treatment,* even without symptoms of visceral injury, is immediate enlargement of the wound, in order to explore the abdomen, check hemorrhage, and close such visceral perforations as may be found. The abdomen is then flushed with salt solution, and closed or drained, according to the amount of soiling present. If the omentum protrudes it should be ligated and removed, while coils of intestine should be carefully washed with salt solution and returned to the cavity. In cases in which there is doubt as to whether or not a wound enters the peritoneal cavity, such wound should be enlarged and the diagnosis positively

made, being prepared at the same time to treat any visceral injuries that may be found. In gunshot wounds on the battlefield an exception has been made to the rule of immediate exploration, because it has been found that the chances of recovery are somewhat better without than with operation undertaken in the absence of proper facilities."—(Stewart's *Surgery*.)

7. High-frequency currents, and X-rays.

8. Gradual dilatation, continuous dilatation, excision of the stricture, internal urethrotomy, external urethrotomy, Wheelhouse's operation, Cock's operation.

9. *Curettage is indicated:* (1) For removal of placental débris (2) in hemorrhagic endometritis, (3) in some forms of dysmenorrhea (membranous), (4) for diagnostic purposes, (5) in some cases of puerperal sepsis, (6) sometimes to check hemorrhage, due to fibroids. *Contraindications:* (1) The least suspicion of even the possibility of pregnancy; (2) menstruation; (3) acute endometritis; (4) malignant disease of the uterus or vagina; (4) acute pelvic inflammation.

Technique: All antiseptic and aseptic precautions are necessary, the patient should be in the dorsal position, the vagina is to be disinfected, and the cervical canal dilated; a speculum is introduced into the vagina and the cervix is drawn down with volsella; the uterine cavity is irrigated with creolin or lysol; a curette is inserted to the fundus and moved down to the internal os; the operator should begin at one cornu and go in the same direction all around till he reaches the starting point, and if necessary repeat till no more spongy or hyperplastic tissue appears; the fundus should be scraped separately by moving the curette along it from side to side; in going toward the fundus no scraping should be done, and care must be taken not to perforate the uterus; should this happen no fluid must be injected; otherwise the uterus and vagina are again irritated, and one or more strips of iodoform gauze are inserted into the cavity to act either as a hemostatic plug or as a drain, which is diminished with two days' interval and withdrawn on the sixth day. A hemostatic tampon should be placed in the vagina and withdrawn the following day. If any fever arises, the tampon is at once removed and the vagina douched with antiseptic fluid every three hours. If not, the vagina is only swabbed with the same every day, and packed loosely with iodoform gauze. After the final removal of the gauze the antiseptic douche is given twice a day until there is no more discharge. The patient should remain in bed for a week.

10. Orchitis, sarcoma, and hernia may result. An ectopic

testicle should be placed in the scrotum if possible before puberty, or removed.

OBSTETRICS.

1. "The examiner stands alongside the patient, facing her head; the tips of the fingers of both hands, moving together and at equal distances from the middle line, are carried up the sides of the abdomen by a series of tapping movements; and upon one side (for example, the left, in the L. O. A. position) is noticed a firm, broad, even sense of resistance, contrasting with the cystic, tumor-like sensation of the other side, with the occasional encounter of firm, irregular bodies—the fetal extremities. This firm, broad, even resistance is produced by the fetal back, and to confirm this fact, the extremities are felt for by a rubbing motion with one outstretched hand on the opposite side. They are felt as cylindrical, irregular bodies, slipping away from the hand, and changing their position from time to time. Having located the back and the extremities, the portion of the fetal ellipse presenting at the superior strait is next ascertained. The examiner now faces the woman's feet and, with the outstretched hands, the fingers parallel with and the middle finger over the center of Poupart's ligament into the pelvic cavity. If the head is presenting, it is felt as a hard, regular, round body, the greater mass of the occiput, the sharp point of the chin, and the groove between occiput and back being often distinguishable. At the same time, the density of the head, its compressibility, its approximate size, and its relative size to the pelvis may be learned."—(Hirst's *Obstetrics.*)

2. "External pelvimetry. The external measurements taken from certain fixed landmarks on the living pelvis, by an instrument known as a pelvimeter, are generally classed as certain signs. These measurements should be taken with the patient on her back, preferably on a table, and covered with a sheet. The head and shoulders should be raised and the knees flexed. Between the anterior superior spinous processes of the iliac bones; the distances between the iliac crests, the inter-trochanteric and the external conjugate. In measuring the above the physician should stand by the side of the patient, and holding the pelvimeter between the thumb and fingers, the points should be applied to the outer sides of the points above mentioned. In measuring the external conjugate, the patient should lie on her side with her face away from the physician.

Between anterior spines.....10¼ inches
" the highest point of the iliac crests, ...11 "
" trochanters .....12¼ "
—(Landis' *Obstetrics.*)

3. Coiling, compression, and prolapse. If not already ruptured, the membranes should be preserved as long as possible, and replacement of a prolapsed cord be tried by the postural method. After rupture of the membranes, replacement of the cord should be tried, and failing this, speedy delivery of the child.

4. *Cesarean section* is indicated in extreme degrees of pelvic contraction, such as a conjugate of 2½ inches or less; exostoses, or uterine tumors; extreme atresia; rupture of uterus, and sudden maternal death.

5. "After the cord has been ligated and cut, the eyes should be cleansed with a saturated solution of boric acid, after which, if there is any vaginal discharge from the mother, 1 or 2 drops of a 1 per cent. solution of silver nitrate should be instilled in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100° F., carefully dried, and the cord dusted with some antiseptic powder. Sponging should be practised for 10 days, after which a full tub-bath at 98° F. should be given daily for 6 months. The temperature may then be reduced to 95° F., and at the end of a year to 90° F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel, and dusting-powders should be used to prevent chafing. An infant may be taken out of doors in summer when 1 week old, and in winter on pleasant days at 3 months of age. The new-born infant should sleep about 22 hours out of a posible 24, gradually diminishing this until at 2 years the child should sleep at least 12 hours of the day, and at 3 years not less than 11. The sleeping room should be well ventilated."—(Gould and Pyle's *Pocket Cyclopedia.*)

6. The *room* should be large, with plenty of light and air, and well heated, and not too near the bathroom or water-closet. The room should be as clean and aseptic as possible, and all unnecessary hangings, furniture, etc., should be temporarily removed. The *bed* should be narrow, not too low, should be accessible from both sides. The mattress should be firm, not too low, and be covered by a rubber sheet. The sheet is spread above this. Everything should be absolutely clean. Over the sheet should be placed the special coverings which are to be removed at the end of labor.

7. *Four causes of dystocia:* Deformed pelvis; tumors of the pelvis or of the genital canal; rigidity of os uteri; and hydrocephalus.

Hydrocephalus should be treated by puncturing the cranium or spinal cord, and so drawing off the fluid.

8. If rotation has taken place, the forceps should be applied to the side of the face, beneath the child's body. When the chin is in front, pass the forceps under the child's back and raise the handles. In extraction, when the head is flexed, the child's back should be carried toward the mother's back.—(Landis.)

9. *Involution* is the process by which the uterus, after labor, returns as near as possible to the condition in which it was before pregnancy. *Causes of delayed involution and subinvolution:* Getting up too soon, too rapid pregnancies, mismanagement of labor, active or passive congestion of the uterus, sepsis, uterine displacement.

10. Forceps must be applied. "In the difficult cases in which instrumental delivery is required from the beginning, the occiput becoming engaged in the posterior position, the head must be dragged down to the vulvar orifice and the outward traction continued until the brow become firmly fixed under the symphysis; the forceps must then be grasped in the right hand and the head lifted steadily upward until the occiput be almost on the point of emerging from the vulvar orifice, when the handles must be carried downward over the perineum, the face appearing from beneath the symphysis. In rare cases excellent results may be obtained by converting the abnormal position into a face presentation with the chin anterior."—(Dorland's *Obstetrics.*)

CHEMISTRY.

1. *Test for free hydrochloric acid in gastric contents:* Gunzburg's reagent (phloroglucin 2 grams; vanillin, 1 gram; dissolved in 100 cc. of alchohol) freshly prepared, and a few drops of filtered gastric contents (equal parts of each) are mixed in a porcelain dish, and then evaporated in a water bath; in the presence of free mineral acids a bright scarlet is produced, beginning at the upper border.

2. *Test for chlorides:* Addition of silver nitrate gives a white flocculent precipitate which is insoluble in nitric acid, but soluble in ammonium hydroxide.

Test for urates: Addition of dilute nitric acid followed by evaporation to dryness leaves a yellowish-red residue. Then add a little ammonia, and the residue turns to violet.

Test for earthy phosphates: Addition of ammonia causes a white precipitate, which becomes more apparent on standing.

3. The presence of sewage in water can be chemically

detected by adding a solution of permanganate of potassium; in the presence of sewage rapid decoloration occurs.

4. By making a confirmatory test by the fermentation method; this latter is only positive with "sugar."

5. *Test for indican in the urine:* The urine is mixed with one-fifth its volume of 20 per cent. solution of lead acetate and filtered. The filtrate is mixed with an equal volume of fuming hydrochloric acid containing 3:1000 of ferric chloride, a few drops of chloroform are added, and the mixture strongly shaken one to two minutes. With normal urine the chloroform remains colorless, or almost so; but if an excess of indoxyl compounds be present the chloroform is colored blue, and the depth of the color is a rough indication of the degree of the excess.

MATERIA MEDICA.

1. DIGITALIS. *Official title:* Digitalis. *Preparations and Doses:* Fluidextract, ♏j; extract, gr. 1-5; infusion, ʒij; tincture, ♏xv.

2. Dose of codeine sulphate, gr. ½; of atropine sulphate, gr. 1-160; of hyoscyin hydrobromide, gr. 1-128; of cocaine hydrochloride, gr. ½.

3. The official preparations of ergot and their doses are: Ergot, thirty grains; extract of ergot, seven and a half grains; fluidextract of ergot, thirty minims; wine of ergot, two drams.

4. *Tonic:* Tincture of ferric chloride. *Stimulant:* Ammonia water. *Emetic:* Apomorphine hydrochloride. *Astringent:* Alum.

5. Two alkaloids, *of Nux Vomica:* Strychnine and brucine; of *Cinchona:* Quinine and cinchonine; of *Opium:* Morphine and codeine.

DIAGNOSIS.

1. Infantile rheumatism is extremely rare; pain and tenderness of the legs only should in an infant invariably suggest scurvy rather than rheumatism. In scurvy the extreme soreness of the legs, spongy swollen gums, swelling near the large joints, a tendency to hemorrhages, and a usual history of the prolonged use of some proprietary infant food or sterilized or condensed milk will be present. If any doubt exists this will be removed by the prompt improvement and generally rapid cure following an antiscorbutic diet. (From Holt's *Diseases of Infancy and Children.*)

2. The following table (from Eisendrath's *Surgical Diagnosis*) gives the diagnosis:

COMA FROM INTRACRANIAL INJURY.	APOPLECTIC COMA.	UREMIC COMA.	ALCOHOLIC COMA.	OPIUM POISONING.
Deep coma; may have history of onset after fall or injury. Evidence of fracture of vertex or base.	Deep coma; sudden onset. If any injury, only a scalp wound.	Deep coma. Slow onset unless convulsions have preceded the coma.	Can be aroused by supraorbital pressure unless very profound.	Can be aroused unless very deep.
Pupil dilated on side of lesion. Choked disc.	Pupils unequal or dilated. Contracted in hemorrhage into the pons.	Albuminuric retinitis.	Pupils normal or somewhat dilated.	Pupils contracted to pinpoint size.
Pulse very slow.	Pulse full and slow, often arteriosclerotic high-tension pulse.	Pulse rapid.	Pulse more rapid than normal and full.	Pulse rapid, may be irregular.
Respiration slow and stertorous.	Respiration slow and irregular.	Respiration frequent and irregular.	Regular respiration.	Respiration very slow —may be 6 to 8 per minute.
Temperature higher —101°.	Temperature higher on paralyzed side, but lower in rectum.		May be low or normal.	
Urine normal or contains trace of albumin.	Urine contains trace of albumin, but may be same as in uremia.	Urine shows albumin, casts, and low urea percentage.	Normal.	Normal.
Hemiplegia on opposite side to that of injury. If contusion of brain is also present, may have generalized convulsions.	Hemiplegia with convulsions on one side.			

3. *Duodenal ulcer:* Localized pain and tenderness, pain is generally worst about three or four hours after a meal; vomiting, hematemesis, and anemia; there is excess of hydrochloric acid.

Gastralgia is a neuralgic pain, not limited in area, and not affected by food.

Gastritis has fever and signs of toxemia; generally no blood in the vomited matter.

Gastric cancer: Pain is irregular, vomiting not marked, if hematemesis is present, the blood has appearance of coffee-grounds, cachexia is noticed, hydrochloric acid is absent or diminished, lactic acid is present

4. *Cholecystitis* may have no symptoms unless colic is present, when there is a severe and sudden pain in hepatic region or near right shoulder, collapse, cold sweat, livid color.

Intestinal obstruction: Pain, collapse, and constipation, and may be stercoraceous vomiting.

ACUTE APPENDICITIS.	ACUTE SALPINGITIS.
1. Muscular rigidity marked.	1. But little rigidity.
2. Pain begins at umbilicus and becomes localized over McBurney's point unless appendix points to pelvis.	2. Pain lower down in abdomen just above Poupart's ligament.
3. Tenderness over right iliac fossa.	3. Tenderness low down over pelvis.
4. Pain followed in a few hours by nausea and vomiting.	4. Nausea and vomiting infrequent.
5. Bimanual examination negative unless appendix in pelvis, then tenderness lateral to uterus.	5. Bimanual examination shows tender mass lateral to or behind uterus.
6. No history of gonorrheal infection.	6. Usually history of infection to be obtained.

When acute appendicitis occurs during the course of an acute inflammation of the female pelvic organs a differentiation is impossible, except that the pain is most intense over McBurney's point.—(Eisendrath.)

5.

ACUTE IRITIS.	ACUTE CONJUNCTIVITIS.	ACUTE GLAUCOMA.
1. Pupil: small, sluggish, irregular after atropine.	Normal.	Dilated, oval, fixed.

ACUTE IRITIS.	ACUTE CONJUNCTIVITIS.	ACUTE GLAUCOMA.
2. Iris: swollen, dirty, lymph on surface.	Clean and bright.	Swollen and discolored.
3. Anterior chamber: normal (or deeper, with turbid contents).	Normal.	Shallow.
4. Cornea: clear (or with deposits on back).	Clear.	Steamy; *anesthetic.*
5. Ciliary region: injected.	Not injected.	Injected.
6. Conjunctiva: usually some injection.	Red, opaque, perhaps swollen.	Great congestion, perhaps chemosis.
7. Discharge: tears only.	Mucopus.	Tears only.
8. Palpation: tension normal (occasionally + 1); tender in ciliary region.	Tension normal, not tender.	Tension + 2 to 3, very tender.
9. Pain: over forehead and nose, worse at night.	Sand or grit in eyes.	Intense neuralgia in and about eyes, nausea, vomiting.
10. Vision: clouded.	Scarcely affected.	Rapidly lost; field extremely limited; "rainbow rings" seen.
11. Disc: if seen, normal.	Normal.	If seen, cupped, and arterial pulsation.

HYGIENE.

1. *Scarlet fever.* "*The treatment* consists first in isolation until desquamation has been completed. The patient should be placed in bed and liquid diet should be prescribed. The room should be well ventilated and all unnecessary furnishings should be removed. A sheet wet with some antiseptic solution should be hung over the doorway, and attendants should be covered with long gowns to prevent carrying the infection in their clothing. Careful disinfection of the hands, face, and hair is absolutely necessary on the part of the physician, nurse, and other attendants. The throat and nose should be cleansed by some alkaline or antiseptic solution, such as Dobell's,

peroxide of hydrogen, or soda bicarbonate solution. The throat symptoms may be relieved by the inhalation of vapor containing eucalyptus oil, turpentine, etc. The gastrointestinal disturbances will require the use of calomel, and the vomiting may be controlled by small pieces of cracked ice, paregoric (gtt. 1-5), or cocaine (gr. 1/20). Acetanilid (gr. ½ for each year of age), phenacetin, or quinine (gr. ½-1) will relieve the nervous system. If the pulse becomes weak and the heart irregular, stimulants, such as aromatic spirits of ammonia (gtt. 10), brandy or whisky (gtt. 10), strychnine (gr. 1/100-1/30), nitroglycerin (gr. 1/500-1/100), etc., are indicated. Daily sponging with some antiseptic solution and inunctions with cacao-butter are very beneficial. Convalescence should be carefully guarded, and tonics and stimulants are required." —(*Pocket Cyclopedia.*)

2. *Acute nephritis: The treatment* consists largely in rest in bed, warmth, milk diet, and attempts at elimination of waste products. Free purgation should be secured by means of the salines, calomel, or compound jalap powder. Diaphoresis may be favored by the administration of sweet spirits of niter, and in severe cases, pilocarpin, and by the use of warm baths, warm applications, or the vapor bath. Tincture of digitalis (♏ 5-20 every 4 hours), tincture of strophanthus, or spartein (gr. ¼-½) may be given as diuretics. Infusion of cream of tartar and juniper berries may be employed. The occurrence of uremia will require prompt and energetic measures.

3. Scarlet fever and measles.

The principal means of preventing the spread of contagious diseases in schools are: Regular and efficient inspection by physicians; prompt exclusion and isolation of anyone suffering from a contagious disease, or coming from a house where such disease is; compulsory notification of all infectious and contagious disease; individual towels, drinking vessels, and other implements; children who have had a contagious or infectious disease or who have come from a house where such disease prevailed should not be readmitted to school until sufficient time has elapsed since the occurrence of the last case to insure safety.

4. Myopia, hypermetropia, and astigmatism are the most frequent defects of vision in school children. The school authorities should provide books with proper paper and print, suitable illumination, desks of proper height; proper positions in reading and writing should be enforced; the children should not use their eyes when tired; excessive study should be forbidden. The child's eyes should be examined and glasses provided by a competent physician.

5. *Pulmonary tuberculosis:* "*The treatment* consists

largely in the liberal use of fresh air, sunlight, pure water, good food, exercise, hygiene, etc. The digestion should receive attention, and nitrogenous and fatty elements should predominate in the diet. Counterirritation is sometimes useful in the early stages, and pneumotherapy or the use of air at modified pressures is always beneficial. Creosote and other drugs of this class, together with iodine and its preparations, are especially beneficial. Oxygen, nitrous oxide, digitalis, have been used with benefit. The general nutrition of the patient should be maintained by the use of iron, cod-liver oil, hypophosphites, etc. Diarrhea will require irrigation and cleansing of the bowels and the administration of intestinal antiseptics and astringents. Vomiting may be controlled by restricted diet, strychnine, bromide, etc. Night sweats may be prevented by atropine, picrotoxin, aromatic sulphuric acid, and sponging with alum in alcohol. Hemorrhage may be controlled by rest, the application of an ice-bag to the chest, and the administration of ergot, morphine, gallic acid, atropine, calcium chloride, etc. Fever is best treated by rest and cold applications. Cough may be checked, when excessive, by the administration of opium, hydrocyanic acid, chloroform, or the bromides, and pain will require the use of rubefacients, counterirritation, or anodynes."—(*Pocket Cyclopedia.*)

Hygienic precautions to be taken in treating a case of tuberculosis: "The patient's quarters should be free from dust, and admit of spending many hours daily in the open air in all weathers, properly sheltered, and, if very ill, lying wrapped in a hammock or reclining chair. His bedroom should be well aired at night, draughts being avoided. The room should be uncarpeted and free from hangings. It should be often cleaned and periodically disinfected. All sputum should be collected in paper spit-cups, which should be burned daily. Smoking should be forbidden. Harm is done by any exercise which results in fatigue, and while fever exists it should not be attempted at all. Patients should be taught the necessity of practising lung gymnastics and breathing only through the nose, which should be kept clear and free from occlusion by secretions, or an hypertrophied catarrhal mucosa. . . . The clothing should be woollen, but not too heavy, or sweating is increased; and a flannel nightgown and loosely knit leggings should be worn at night in cool weather. The skin should be cleansed by daily sponge-baths of lukewarm alcohol and water."—(Thompson's *Practical Medicine.*)

STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF SOUTH CAROLINA.

GENERAL ANATOMY (Junior Curriculum).

1. Name group of bones that make up lower extremity.
2. Name the seven muscles of the orbital region.
3. Name branches of brachial artery.
4. Name the five veins of the neck which return the blood from the head and face.
5. Show by drawing the regions of abdomen.

SURGICAL ANATOMY (Senior Curriculum).

1. Why is the shoulder joint most liable to dislocation?
2. Where is congenital dislocation most often found? How diagnosed?
3. Name the arteries met with in lateral lithotomy.
4. Where in the appendages does extrauterine pregnancy most commonly occur?
5. In deafness, after history of injury, how by tuning fork would you determine whether the nerve itself was destroyed or was due to some lesion of auditory apparatus?
6. Which of the vessels of the arterial system is most frequently the seat of disease, and what part or portion?
7. Why, when, and where would you make lumbar puncture?
8. Symptoms of irritation of phrenic nerve? What would be the consequence of bilateral paralysis of this nerve? Fracture dislocation of what cervical vertebra would produce this paralysis?
9. When and why would you use the Trendelenburg position? When and why would you use Fowler's position?
10. Of what surgical importance is the location of the lower part of the brachial artery in venesection?

PHYSIOLOGY (Junior Curriculum).

1. Name the varieties of cartilage and state where each is found.
2. What produces the second sound of the heart and what events in the heart's action are coincident with it?
3. Give the varieties of secreting glands and examples of each.
4. Give the functions of the 10th cranial or pneumogastric nerve according to its distribution.
5. What is the purpose of respiration and what changes take place in the respired air?

HYGIENE (Senior Curriculum).

1. Name the common breeding places of house flies.

Tell how best to destroy flies, and name diseases transmitted by them.

2. How is the hookworm propagated? How does it gain entrance into the human system, and how is the disease spread?

3. Given case of typhoid fever, describe proper precautions to prevent spread of disease.

4. How long is it necessary to quarantine in scarlet fever, measles, diphtheria, and smallpox respectively?

5. What would constitute an ideal sleeping room?

6. Describe a sanitary rural privy.

7. In an inspection of public school children, what diseases or abnormalities are commonly found which ought to be corrected and, briefly, why?

8. In scabies in school children what would you do?

9. Given an infant 6 months old, emaciated, anemic, one or more joints swollen and painful, fed on malted milk exclusively, give diagnosis, cause of condition, and proper feeding to restore to health.

10. Give diet in diabetes, chronic nephritis, rheumatism, phthisis, and why.

CHEMISTRY (Junior Curriculum).

1. Define an element, an atom, a molecule, and chemical force.

2. Give the chemical name and formula for each of the following: Caustic potash, saltpeter, Epsom salts, lime, and calomel.

3. Differentiate dialysis and osmosis.

4. How is formaldehyde prepared? In what forms is it used as a disinfectant?

5. What is electrolysis? Give example. Give the forms of electricity in clinical use.

PRACTICAL URANALYSIS, MICROSCOPY, AND TOXICOLOGY.
(Senior Curriculum.)

1. What is the reaction of normal urine? To what is it due?

2. What is a urinometer? Give specific directions for its use. State how it may aid in diagnosis.

3. Give concisely the technique of a chemical examination of the urine for life insurance.

4. Give concisely the technique of a microscopic examination of the urine.

5. State how you would examine for pus in the urine if you had no microscope.

6. What do you understand by a corrosive poison? How soon after taking will symptoms develop?

7. How does a corrosive poison differ from an irritant poison? Give an example of each.

8. Give symptoms and chemical and physiological antidote for digitalis poisoning.
9. Give symptoms and chemical antidote for acute acetate of lead poisoning.
10. How do chemical and physiological antidotes differ in action?

MATERIA MEDICA (Junior Curriculum).

1. Give two antipyretics.
2. Give two hydragogue cathartics.
3. Give two cholagogue cathartics.
4. Give two diuretics.
Give dose to effect of each of the above drugs.
5. Give dose and physiological effect of (*a*) morphine. (*b*) strychnine, (*c*) atropine, (*d*) pilocarpine.

PRACTICE OF MEDICINE.

1. What symptoms would determine you in arriving at a diagnosis of: (*a*) grand mal, (*b*) petit mal, (*c*) Jacksonian epilepsy?
2. What are the clinical symptoms of the conditions which are liable to follow lobar pneumonia?
3. A man 40 years old has a blood-pressure of 180. Discuss its clinical significance.
4. What are the symptoms of carcinoma of the liver?
5. Describe a case of acute follicular tonsillitis, stating the diseases with which it might be confounded and their diagnostic differences. Give treatment you would use for a case of that affection.
6. Give etiology, symptoms, and treatment of parenchymatous nephritis.
7. In what diseases may hemorrhage from the bowels occur? What assistance in diagnosis may be obtained from inspection of the stools?
8. Discuss poliomyelitis: (*a*) Etiology, (*b*) premonitory symptoms, (*c*) symptoms, (*d*) prognosis, (*e*) treatment, including precautions, if any, you would take to prevent spread of the disease.
9. In what diseases is lobar pneumonia most liable to occur as a complication? What symptoms would cause you to suspect such a complication existed?
10. In June it is necessary to feed artificially an infant 8 months old; give explicit directions so that an intelligent mother could follow your instructions.

OBSTETRICS.

1. Define hysterectomy, and state its indications.
2. How is an ovarian tumor to be diagnosed from pregnancy?
3. What may result from laceration of the perineum?

4. Describe the symptoms and management of an incomplete abortion.
5. Describe the human embryo during the second month.
6. Give treatment of eclampsia.
7. How is a posterior position of the occiput to be diagnosed and managed?
8. What are the dangers of a breech presentation, and how should an impacted breech be managed?
9. Diagnose and give mechanism and delivery in face presentation.
10. How would you treat a case of placenta prævia when hemorrhage occurs prior to full term? (*b*) How would you treat a case of postpartum hemorrhage?
11. Describe (*a*) funic souffle, (*b*) uterine souffle, (*c*) ballottement, (*d*) Hegar's sign, (*e*) Braxton Hick's sign, (*f*) Rasch's sign, and (*g*) Jacquemier's sign.
12. What would lead you to suspect extrauterine pregnancy?
13. Give two symptoms of toxemia of pregnancy with treatment of each.

Answer only ten questions.

SURGERY.

1. Define anesthesia. Mention two favorite general anesthetics. What can you say as to their relative merits?
2. Describe intubation of the larynx (O'Dwyer's operation).
3. Mention several steps in performing perineal section (external perineal urethrotomy).
4. What is phimosis? What is the treatment? Describe the operation.
5. Acute cystitis; give symptoms and treatment.
6. Describe ligation of the radial artery in the upper third.
7. What are fractures? Mention different varieties. How would you diagnose fracture? What are the indications in treating a fracture?
8. Dislocation of the elbow joint: In backward dislocation of both bones what would be the symptoms? The treatment?
9. Mention the several steps in amputating the forearm through the middle third.
10. In burns and scalds what are the local symptoms? The constitutional symptoms? What the local treatment? The constitutional treatment?

BACTERIOLOGY AND PATHOLOGY (Junior Curriculum).

1. Name three pyogenic bacteria. Where are they found in health? Where in disease? And give usual method of staining.

2. Describe the diphtheria bacillus. How would you obtain a specimen for examination, and how would you determine when to release a patient from quarantine?
3. Describe the pathology of scarlet fever and give the usual complications.
4. How are tumors usually classified? Describe a myoma and an epithelioma.
5. Give the pathology of mitral insufficiency with loss of compensation.

MEDICAL JURISPRUDENCE (Senior Curriculum).

1. In gunshot wounds differentiate point of entrance from point of exit and give medicolegal significance of position of wound and direction of wound.
2. Describe the post-mortem findings in phosphorus poisoning; from what industrial source is poison usually obtained? Give antidote.
3. Give immedite and remote effects of concentrated lye poisoning. To what class of poisons does it belong?
4. Describe in detail the healing process in a case of burn.
5. In suspected case of criminal abortion how would you determine whether pregnancy had existed?
6. Give the most important medicolegal question arising in the disposition of property by will.
7. State order in which decomposition usually takes place in a dead body. What conditions hasten it, what retard it?
8. What are the post-mortem findings in drowning?
9. Differentiate a stillborn infant, full term, from one dying a few hours after birth.
10. Mr. A., past middle life, retires at 9 P. M., apparently in good health, and is found dead in bed at 7 A. M. with rigor mortis well marked. Give probable hour of death and state what diseases might have caused death.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

STATE BOARD OF MEDICAL EXAMINERS OF SOUTH CAROLINA.

GENERAL ANATOMY.

1. Os innominatum (ilium, ischium, pubis); femur; patella; tibia; fibula; tarsus (os calcis, astragalus, cuboid, scaphoid, internal cuneiform, middle cuneiform, external cuneiform); five metatarsals; fourteen phalanges.
2. *Seven muscles of orbital region:* Levator palpebræ superioris, rectus superior, rectus inferior, rectus internus, rectus externus, obliquus superior, and obliquus inferior.
3. *Branches of brachial artery:* Superior profounda, in-

ferior profunda, nutrient, anastomotica magna, and muscular.

4. *Five veins of the neck which return the blood from the head and face:* External jugular, posterior external jugular, anterior jugular, internal jugular, and vertebral.

5. The regions of the abdomen and their contents are shown in the following table. It is to be remembered that the contents will vary according to the position of the lines drawn; these are arbitrary, and nearly every writer differs from every other. In the following table the superior horizontal line extends between the cartilaginous ends of the tenth ribs, the inferior between the anterior superior iliac spines. The vertical lines pass upward from the iliopectineal eminences, at right angles, to the upper horizontal line.

The viscera situated in each region are as follows:

RIGHT HYPOCHONDRIAC.	EPIGASTRIC.	LEFT HYPOCHONDRIAC.
Liver.	Liver.	Stomach.
Right kidney.	Stomach.	Spleen.
Hepatic flexure of the colon.	Gall-bladder.	Left kidney.
	Duodenum.	Splenic flexure of the colon.
	Pancreas.	
RIGHT LUMBAR.	UMBILICAL.	LEFT LUMBAR.
Right kidney.	Transverse colon.	Small part of left kidney.
Ascending colon.	Duodenum and small intestines.	Descending colon.
Ileum.	Great omentum.	Small intestines.
RIGHT ILIAC.	HYPOGASTRIC.	LEFT ILIAC.
Cecum.	Small intestines.	Sigmoid colon.
Appendix.	Bladder in children.	Small intestines.
Last coil of ileum.	Distended bladder in adults.	
	Pregnant uterus.	
	Sigmoid colon.	

SURGICAL ANATOMY.

1. *The shoulder joint is most liable to dislocations,* on account of: (1) The shallowness of the glenoid fossa; (2) the large size of the head of the humerus; (3) great freedom of motion; (4) the thinness and laxity of the capsular ligament; (5) the joint depends on the surrounding muscles for its strength; (6) the long leverage of the arm; (7) its exposure to violence.

2. Congenital dislocation is most often found at the hip

joint; it gives rise to extreme lordosis, and a waddling gait is noticed when the child attempts to walk.

3. *The arteries met with in lateral lithotomy:* Transverse perineal, external hemorrhoidal (artery of the bulb and pudic artery).

4. Extrauterine pregnancy most often occurs in the Fallopian tube.

5. The distinction between ordinary deafness and the nervous form is made by testing with watch or tuning fork. "If the ticking of a watch or the vibrations of a tuning fork are heard faintly or not at all when held at varying distances from the ear (aerial conduction), but become distinctly audible when the watch or the handle of the fork is placed in contact with the skull or mastoid process (bone conduction), the deafness is of the ordinary variety and due to aural disease. If, on the other hand, watch and fork are heard indistinctly or not at all, both in contact and at a distance, the deafness is due to some lesion of the nerve or its connections. In the first case the nerve is normal and can appreciate vibrations brought by the bone, while, through some fault in the mechanism, aerial vibrations are not transmitted to the nerve endings. In the second case the nerve is at fault and cannot appreciate vibrations, no matter how well they may be conducted."—(Butler's *Diagnostics of Internal Medicine.*)

6. The aorta, more especially the arch, is, of all the vessels of the arterial system, most frequently the seat of disease.

7. *Lumbar puncture* may be made for diagnostic purposes, therapeutically, or for administration of spinal anesthesia. The puncture is made below the second lumbar vertebra, usually between the third and fourth lumbar spines.

8. Irritation of the phrenic nerve may cause hiccough and persistent cough. Bilateral paralysis of the phrenic nerve causes death from paralysis of the diaphragm. Fracture dislocation of the third cervical vertebra will produce this paralysis.

9. In the lymphatics of the peritoneum, those of the diaphragm are more rapid in absorption than those of the pelvis.

To stimulate, the patient should have the foot of his bed raised (*Trendelenburg's position*), so that the fluid (salt solution) may be conveyed more readily to the diaphragm, where absorption is more rapid.

To retard the too rapid absorption of pus in the abdominal cavity, the head of the bed should be raised (*Fowler's position*) so that drainage may be directed toward the pelvis, where absorption is slower.

10. "The lower part of the brachial artery is of interest

in a surgical point of view, on account of the relation which it bears to the veins most commonly opened in venesection. Of these vessels, the median basilic is the largest and most prominent, and, consequently, the one usually selected for the operation. It should be remembered that this vein runs parallel with the brachial artery, from which it is separated by the bicipital fascia, and that care should be taken in opening the vein not to carry the incision too deeply, so as to endanger the artery." (Gray.)

PHYSIOLOGY.

1. *Varieties of cartilage.* I. *Hyaline;* found in the joints, at the ends of the ribs, in the nose, trachea, bronchi, and larynx. 2. *Yellow elastic;* found in the external ear, Eustachian tube, epiglottis, and in cartilages of Santorini and Wrisberg. 3. *White fibrous;* found in intervertebral substance, symphysis pubis, and larynx.

2. The second sound of the heart is caused by the vibration due to the closure of the semilunar valve; coincident with it are: the commencing dilatation of the ventricles, opening of the auriculo-ventricular valve, continuation of the auricular diastole, and closing of the semilunar valves.

3. I. SIMPLE GLANDS.—Duct undivided.

(*a*) *Simple tubular*—Undilated at end—*e.g.* Lieberkühn's follicles, sweat, and many gastric glands.

(*b*) *Simple acinous* (*alveolar or saccular.*)—Dilated at end—*e.g.* some sebaceous glands (rare).

II. COMPOUND GLANDS.—Duct divided.

(*a*) *Compound tubular.*—Branched elongated tubes, no tubes, no acini—*e.g.* most gastric glands.

(*b*) *Compound acinous or alveolar* (*racemose glands*), branched duct with saccular acini on terminal branches—*e.g.* salivary, sebaceous, and Meibomian glands; the mucous glands of the mouth, tongue, palate, pharynx, nose, esophagus, and respiratory tube.

(*c*) *Acino-tubular.*—Branched duct, with elongated narrow acini on terminal branches—*e.g.* Brunner's glands.

(From Cunningham's *Anatomy.*)

4. *Functions of the pneumogastric nerve:* "Throughout its whole course the vagus contains both sensory and motor fibers. To summarize the many functions of this nerve . . . it may be said that it supplies (1) *motor* influence to the pharynx and esophagus, stomach, and intestines, to the larynx, trachea, bronchi, and lungs; (2) *sensory* and, in part, (3) *vasomotor* influence, to the same regions; (4) *inhibitory* influence to the *heart;* (5) *inhibitory* afferent impulses to the *vasomotor center;* (6) *excito-secretory* to the salivary glands; (7) *excito-motor* in coughing, vomiting, etc." (Kirkes' *Physiology.*)

5. The purpose of respiration is to provide oxygen to the blood and tissues, and to eliminate carbon dioxide.

	EXPIRED AIR.	INSPIRED AIR.
Oxygen	16.6 per cent.	21 per cent.
Nitrogen	79 per cent.	79 per cent.
Carbon dioxide...	4.4 per cent.	0.04 per cent.
Other gases.....	Often present.	Rare.
Watery vapor....	Saturated.	Variable.
Temperature	That of body.	Variable.
Volume	Diminished.	Varies.
Bacteria	None.	Always present.
Dust	None.	Always present.

HYGIENE.

1. Common breeding places of house flies: Manure heaps, privy vaults, garbage pails, etc. Flies are best destroyed by being caught on fly papers or in fly traps, and then burned. *Diseases transmitted by flies:* Typhoid, cholera, plague, tuberculosis, dysentery, anthrax, and intestinal parasites.

2. The hookworm is propagated by water, food and dirt. It enters the system by the alimentary canal and by the skin. It is spread by the feces of infected patients.

3. Typhoid fever is preventible. When the municipal authorities do not consider it their duty to supply pure water ,each household should boil all water that is to be used for drinking or for washing dishes, etc.; milk should be boiled also; and no ice should be put in water or other drink or food; flies should be kept out of the house as far as possible, by means of screens or otherwise; all discharges from the sick person must be disinfected; all utensils, dishes, etc., used by the patient must be thoroughly cleansed, and boiled every day; soiled linen must be soaked in a disinfectant solution before being washed; after each attendance on a patient, physician, nurses, and others should wash their hands in a disinfectant; thorough sterilization of all bedding, etc., must be performed after the disease is over.

4. PERIOD OF QUARANTINE for: *Scarlet fever:* till the patient is quite free from sore throat or discharges of any kind, and the desquamation has entirely disappeared; generally six to eight weeks.

Measles: About one month from onset of symptoms provided no sequelæ are present, and no discharges persist.

Diphtheria: till the patient is free from all signs of congestion or rhinitis, and continued bacteriological examination is persistently negative.

Smallpox: till all crusts or scabs have entirely disappeared.

5. The sleeping room should be as large as possible, with the maximum of sunshine and fresh air; it should face the south, or east, or southeast, and should contain no hangings, and have as few "dust-catching" contrivances as possible; it should not lead into a bathroom.

6. *A sanitary rural privy* consists of a "small watertight pit, not drained but roofed over to exclude rain, and so arranged that the excreta and ashes become thoroughly mixed. For this purpose either the ashes must be thrown in through the closet seat, which may be hinged so as to be lifted *en masse,* or else a "shoot" or sloping slab must conduct one or the other to a common point. The floor should be smooth, and raised a few inches above the level of the adjoining ground.

"The contents ought to be removal at fixed short intervals, and the work should be done at night or early in the morning so as to minimize the nuisance." (Whitlegge and Newman.)

7. Infectious diseases, such as measles, scarlet fever, smallpox, chicken pox, mumps, diphtheria; adenoids; strabismus, trachoma; spinal curvature; pediculosis, scabies, ringworm.

8. *The treatment of scabies* "consists in a protracted bath with soap and hot water, followed by the application of sulphur ointment (3i to ℥i) or other parasiticide every night for one week. In the meantime the bed linen and underclothing should be sterilized by heat. At the end of a week another bath should be taken and some sedative ointment or lotion should be prescribed. Sulphur may be substituted by beta-naphthol, balsam of Peru, styrax, tar, staphisagria, etc."—(Gould and Pyle's *Pocket Cyclopedia.*)

9. The infant, probably, has scurvy; due to improper food. This proprietary food should be stopped and the infant be fed on fresh cow's milk, modified if necessary. The addition of fresh fruit juice (orange) may be of value.

10. In *diabetes,* avoid sugars and starches, use gluten bread, saccharin to sweeten; most meats and fish are permissible, green vegetables are allowed. Potatoes and farinaceous foods must be avoided. Eggs, butter, cheese, and milk are allowed.

In *chronic nephritis* milk and vegetables are best; meat, fish, and eggs may be used cautiously; rice is good. The food must be easily assimilable, with minimum of proteids.

Rheumatism: Light broths, soups, vegetables and fruits are allowed; meats, highly seasoned foods, alcohol, tea and coffee should be very sparingly used.

Phthisis: The food must be nutritious, ample, but not too much; milk, eggs, soups, meat, fish, poultry, green

vegetables are all good. Nothing should be fried. Hot bread, cakes, pies, pastry, rich gravies, sweets, lobsters, crabs, and made dishes should be avoided.

CHEMISTRY.

1. An *element* is a kind of substance out of which we cannot, by any known means, get dissimilar substances.

An *atom* is the smallest part of an element that can enter or leave a chemical reaction.

A *molecule* is the smallest portion of matter (element or compound) which can exist in a free state,

Chemical force is that force by which atoms are held together in the molecule.

2. Caustic potash is potassium hydroxide, KHO; saltpeter is potassium nitrate, KNO_3; Epsom salts is magnesium sulphate, $MgSO_4$; lime is calcium oxide, CaO; calomel is mercurous chloride, Hg_2Cl_2.

3. *Dialysis* is the process of separating substances from a mixture by placing the latter in a vessel with porous walls and immersing it in water, when the more diffusible substance passes through the porous wall. This latter process is called *osmosis*. Substances which readily pass through this porous membrane are called *crystalloids;* those which do not are called *colloids*.

4. Formaldehyde is prepared by the dry distillation of calcium formate:

$$Ca(H \cdot COO)_2 = CaCO_3 + H \cdot COH.$$

It is used as a disinfectant under the forms of: Formaldehyde, paraform, trioxymethylene, formalin, formol.

5. Electrolysis is the process of electrical conduction accompanied by the separation of the constituents of the electrolyte or the decomposition of a chemical compound by passing an electric current through it. The primary products of electrolysis are called ions; those which separate at the positive electrode or anode are called anions; those which separate at the negative electrode or cathode are called cations. A solution of sodium chloride contains NaCl, but it also contains the cation Na and the anion Cl; and the action of the electric current is to separate these ions (which are already liberated) at the respective electrodes. It is supposed that the hydrogen and metallic ions are charged with positive electricity, and the hydroxyl and acid-residue ions are charged with negative electricity; hence the former are attracted to the cathode and the latter to the anode.

Forms of electricity in clinical use are: Electricity by friction, by induction, by chemical action, and by magnetism.

PRACTICAL URANALYSIS, MICROSCOPY, AND TOXICOLOGY.

1. The reaction of normal urine is acid; due to acid sodium phosphate.

2. A *urinometer* is a form of hydrometer used for determining the specific gravity of the urine. It consists of a cylinder and a spindle. The graduation on a urinometer is so constructed that the spindle sinks to the zero point when it is immersed in water at a given temperature. The denser the fluid into which the spindle is immersed the higher it rises. The ordinary urinometer is graduated from 0 or 1000 to 60 or 1060.

To use the urinometer: "The cylinder should be without pouring lip, of such depth that the urinometer may be completely immersed, and of a diameter double that of the wide part of the urinometer. Hold the cylinder in an inclined position and pour into it urine to within 2 cm. of the top. Set it upright, float the urinometer in the urine, and add more urine until the level "heaps" above the rim of the cylinder. Now bring the eye to about the level of the top of the cylinder, and, seeing that the urinometer does not touch the wall of the cylinder, read off the specific gravity at the *highest* point where the liquid, drawn up by capillary attraction, cuts the graduation of the urinometer."—(Witthaus' *Urinalysis,* etc.)

The specific gravity of normal urine varies from about 1015 to about 1025. An *abnormally high* specific gravity may be found in: Diabetes mellitus, fevers, and chronic parenchymatous nephritis.

Low specific gravity of the urine may indicate: Diabetes insipidus, chronic interstitial nephritis, contracted kidney, some nervous disorder, albuminuria, hysteria, or some nervous disorders, or the ingestion of an abnormal amount of fluids.

3 and 4. Chemical examination will include: Estimation of chlorides, of phosphates, of sulphates, of indican, of urea, of uric acid or urates; also presence (and quantity) of albumin, sugar, acetone, diacetic acid, blood, bile; the Diazo reaction. The microscopic examination will include examination of sediment for casts, crystals, fat globules epithelial cells, blood, bacteria, and parasites.

5. *Pus* in the urine: Acidify the urine with acetic acid, then filter it, and treat the filter with a few drops of freshly prepared tincture of guaiacum; a deep blue color denotes the presence of pus.

6. A corrosive poison is a substance capable of producing death or serious bodily harm by its chemical action upon a tissue with which it comes in direct contact. Symptoms begin to develop immediately.

7. An irritant poison has to be in solution in the blood

before it begins to take effet. Sulphuric acid is a corrosive; arsenic is an irritant.

8. DIGITALIS POISONING. *Symptoms:* Nausea and occasionally vomiting. Sometimes colic and diarrhea. After two or three hours marked diminution in the frequency of the pulse, which may fall to 40 or even 25. Dyspnea, attended by a sense of oppression in the chest and coldness of the extremities. Headache, vertigo, and tendency to sleep. Usually attacks of syncope occur, provoked sometimes by the slightest movement of the patient.

Chemical antidote: Tannic acid.

Physiological antidote: Aconite and opium.

9. LEAD ACETATE POISONING. The *symptoms* are: "Metallic taste; dryness of the throat; thirst; severe colicky abdominal pains, referred particularly to the umbilical region, and relieved by pressure; pulse very feeble and slow; great prostration; constipation; urine scanty and red; violent cramps; paralysis of the lower extremities; convulsions; and tetanic spasms."

The *treatment* consists in removing the cause and administering the antidote, "magnesium sulphate, which brings about the formation of the insoluble lead sulphate, while the purgative action of the magnesia is also useful. It should be preceded by an emetic, or by the use of the stomach tube."—(Witthaus' *Essentials of Chemistry.*)

10. ANTIDOTES are classified as: (1) *Chemical antidotes,* which act by uniting chemically with the poison and thus converting it into a harmless or insoluble compound. *Example:* Albumin, in mercurial poisoning; sodium sulphate, in carbolic poisoning.

(2) *Physiological antidotes,* which act by combating one (or more) of the physiological actions of the poison. *Example:* Opium will counteract the dilated pupil caused by belladonna.

MATERIA MEDICA.

1. *Two antipyretics:* Aconite, dose 5 to 10 min. of the tincture; and acetanilid, dose, gr. iv.

2. *Two hydragogue cathartics:* Elaterin, dose of the trituration, about 1/10 gr.; and potassium bitartrate, dose ½ to 1 oz.

3. *Two cholagogue cathartics:* Podophyllin, dose of the resin, gr. ½ to j; and aloes, dose 1 to 5 gr. of the extract.

4. *Two diuretics:* Potassium acetate, dose 30 to 60 gr.; and potassium citrate, dose 15 to 30 gr.

5. MORPHINE. *Dose* of sulphate, gr. ⅛ to ½. *Physiological action:* It is analgesic, hypnotic, diaphoretic, narcotic, a respiratory and cardiac stimulant (later a depressant), it checks most secretions (not perspiration), it stimulates the brain, and contracts the pupil.

STRYCHNINE. *Dose* of sulphate, gr. 1/64 to 1/32. *Physiological action:* Strychnine is a bitter tonic, stimulates appetite, secretion, and digestion, increases peristalsis, stimulates the vasomotor centers, and so raises arterial tension, stimulates both accelerator and inhibitory nerves of the heart. All the functions of the spinal cord are exalted by strychnine, reflex, motor, vasomotor, and sensory. Large doses cause dilated pupils, irregular and jerky respiration, increased reflexes.

ATROPINE. *Dose* of sulphate, gr. 1/250 to 1/60. *Physiological effects:* Anodyne, mydriatic, inhibits secretions, depressant of terminations of nerves, accelerates the heart beat, causes rise in blood pressure, but toxic doses cause the blood pressure to fall, stimulates the respiratory center, but large doses depress the same; it may cause vertigo, restlessness, excitement, delirium, or mania.

PILOCARPINE. *Dose* of hydrochloride, gr. ⅛ to ½. It stimulates secretory nerves and involuntary muscles, is a myotic, nervous depressant, and sudorific.

PRACTICE OF MEDICINE.

1. *Grand mal.* The subject suddenly falls, with a peculiar cry, loss of consciousness, and pallor of the face, the body assuming a position of tetanic rigidity, succeeded after a few moments by more or less pronounced clonic convulsions, followed by coma, of several hours' duration. The subject awakens with a confused or sheepish expression, with no knowledge of what has occurred, unless he has injured himself during the attack, either by the fall, or, what is very common, has bitten his tongue during the convulsions. *Petit mal* is manifested either by attacks of vertigo, the consciousness being preserved, or by a passing absent-mindedness, either form being associated with slight convulsive phenomena followed by slight coma, or mental confusion of short duration. *Jacksonian epilepsy* is characterized by convulsive seizures in a definite group of muscles; there may be no loss of consciousness; but in some cases the convulsions become more widespread, and consciousness may become lost.

2. The conditions liable to follow lobar pneumonia are: Pleurisy, pericarditis, endocarditis, thrombosis, embolism, arthritis, jaundice.

3. This *high blood-pressure* may be due to various conditions. "In *chronic interstitial nephritis* the elements of arteriosclerosis, high peripheral resistance, and increased heart energy bring about high readings. In abnormal nervous excitement temporary high pressure may be observed. In secondary myocarditis with *associated arteriosclerosis*, the uremic state, lead poisoning, gout, cerebral hemorrhage, and sometimes in *parenchymatous nephritis*

or early acute nephritis high readings are present."—(Greene's *Medical Diagnosis.*)

4. *Symptoms of carcimonia of liver:* Severe pain and tenderness. Cachexia, *i.e.* loss of flesh and strength, with pallor. Pressure-symptoms: jaundice is common but ascites is rare. Physical examination: the liver is enlarged, its surface is nodular, and the central depression, or umbilications, can often be detected. Symptoms of the primary growth which is usually in the stomach.—(*Stevens.*)

5.—

TONSILLITIS.	DIPHTHERIA	SCARLET FEVER.
1. History of exposure to cold and wet; rheumatac diathesis, or history of previous attack.	1. History o contagion.	1. History of contagion.
2. Onset sudden; high fever rising rapidly.	2. Onset gradual. Urine quickly showing albumin and casts.	2. Onset sudden; strawberry tongue; scarlet red rash; pulse rapid, out of proportion to temperature; convulsions frequent.
3. Severe pain in region of tonsil on opening the mouth; moderate prostration.	3. General body pain as well as pain in angle of jaws; severe cough or bronchitis may be present; prostration severe.	3. Prostration severe.
4. Absence of membrane in all forms; small cheesy lumps in the crypts of gland in follicular tonsilitis.	4. Grayish-white membrane, and on being pulled off leaves behind a bleeding surface; membrane contains Klebs-Loeffler bacilli.	4. False membrane may be present, but absence of Klebs-Loeffler bacilli.
5. No sequels; symptoms subside quickly.	5. Paralysis of nerves of pharynx or eye common.	5. Tendency to nephritis.

The treatment of tonsillitis should begin with the administration of fractional doses of calomel followed by a saline. Sodium salicylate (gr. 7), phenacetin (gr. 5), or quinine (gr. 4), every 4 hours may be of service. The

compound tincture of guaiac (3 1) is also very beneficial. Small pellets of ice may be allowed to dissolve in the mouth, and hot or cold compresses should be used.. In all cases the diet should be light and nutritious.—(*Pocket Cyclopedia.*)

6. CHRONIC PARENCHYMATOUS NEPHRITIS. *Etiology:* It may follow the acute; alcohol, syphilis, exposure to cold and wet, heart disease, adult life and male sex predispose.

Symptoms: The principal symptom is edema in various degrees. Weakness, shortness of breath, and other cardiac symptoms often present themselves. The examination of the urine will reveal the presence of albumin in large quantities, and hyaline casts, oil casts, dark granular casts, casts containing fatty renal cells, free fatty renal cells, and granular fatty cells (compound granule cells). Sometimes blood and blood-cells may be found.

Treatment: Rest, warmth, non-nitrogenous diet, milk alkaline mineral waters and diuretics, saline laxatives.

7. "It is evident that a decision as to the origin of the blood in a given case can be reached only by a careful consideration of the history of symptoms, as well as a painstaking physical examination. It may be of service to bear in mind that the most frequent causes of hemorrhage from the bowel are hemorrhoids, typhoid fever, colitis, and cancer of the colon; that the most frequent causes of *large* intestinal hemorrhages are typhoid fever, portal engorgement from disease of the heart or liver, hemophilia, purpura hæmorrhagica, and rupture of an aneurysm; that the most frequent causes of *small hemorrhages* from the bowel are hemorrhoids, injury to the rectum or a rectal fissure by the passage of feces, ulceration (syphilitic or cancerous) of the rectum, and intussusception in infants and children. The extent of an intestinal hemorrhage, and on occasion its occurrence before appearing in the stools, may be judged by the constitutional symptoms, which are those of internal hemorrhage."—(Butler's *Diagnostics of Internal Medicine.*)

8. *Poliomyelitis.* A disease peculiar to childhood, and characterized by sudden paralysis of one or more limbs or of individual muscle groups, and followed by rapid wasting of the affected parts, with reaction of degeneration and deformity. The onset is sudden and marked by fever, vomiting, convulsions, or even coma. Paralysis and atrophy of the muscles, with reactions of degeneration, then present themselves. The affection is associated with destruction of the ganglion-cells in the anterior gray horns of the spinal cord. It occurs usually during the first three years of life and most often during the summer months. It sometimes occurs in epidemics.

The treatment during the initial stage consists in rest

in bed, restricted diet, fractional doses of calomel, and sponging, or small doses of phenacetin if the fever and nervous symptoms are marked. An ice bag should be placed along the spine, or mild counterirritation to the spine by mustard plasters may be practised. After the acute symptoms have subsided, electricity and passive movements may be employed. Deformities may result and will require the application of mechanic apparatus or surgical operation.—(*Pocket Cyclopedia.*)

Cause is supposed to be a micro-organism. It is therefore considered infectious. *Prognosis* is unfavorable.

9. In typhoid, erysipelas, dysentery, tuberculosis, cerebro-spinal fever. It is generally indicated by a rise in temperature, pain in side, chill, and later signs of consolidation.

10. "The bottle should be thoroughly cleansed with borax and hot water (one tablespoonful of borax to a pint of water) and boiled before using. The nipple should be turned inside out, scrubbed with a brush, using hot borax water. The brush should be used for no other purpose. The bottle and nipple should rest in plain boiled water until wanted. Never use grocery milk. Use only bottled milk which is delivered every morning. From May 1 to October 1 the milk should be boiled five minutes immediately after receiving. A mixture when prepared should be put in a covered glass fruit jar and kept on the ice. *For a baby from the sixth to the ninth month* the following mixture will be found useful: 24 oz. of milk, 24 oz. of barley water, 6 teaspoonfuls of granulated sugar. Feed 6 to 8 oz. at three-hour intervals, six feedings in twenty-four hours."—(From Kerley's *Treatment of Diseases of Children.*)

OBSTETRICS.

1. *Hysterectomy* is removal of the uterus.

The INDICATIONS FOR HYSTERECTOMY are given as follows: *For the abdominal operation:* All solid or cystic tumors of the uterus; cancer; uterine rupture during labor; certain conditions of puerperal sepsis; pregnancy complicated by pelvic deformity, cancer, or other serious obstacle to the passage of the child; uterine prolapse or inversion, and incidentally as a step in the removal of complicated suppurative conditions of the uterine appendages.

For the vaginal operation: Bilateral suppurative conditions of the appendages; prolapse, cancer, pregnancy with cancer before the sixth month; certain septic conditions of the uterus; certain rare conditions which may require the ablation of a small movable uterus.

For the combined operation: Cancer, certain complicated fibroids; failure to secure hemostasis from below.—(From *Reference Handbook of the Medical Sciences.*)

2.—

PREGNANCY.	OVARIAN TUMOR.
The usual signs of pregnancy are present.	There is an absence of the chief signs of pregnancy, as a general rule.
The patient is generally in good health, with an increase of body-weight; there is no characteristic facies.	In advanced cases the ovarian facies is present—a pale, drawn expression, with yellowness of the skin and general emaciation.
The abdominal tumor is hard, non-fluctuating, situated in the median line, and reveals the fetal signs.	The abdominal tumor is soft, fluctuating, showing usually more or less growth to one or the other side, and does not reveal the fetal signs.
There is generally a suppression of menstruation.	Continuance of menstruation is the rule, although it may be altered in character; suppression has been noted.
The cervix is soft (Goodell's sign).	The cervix is probably not altered.
There is history of exposure to the possibility of impregnation, with rapidly-developing enlargement in the median line.	The history is obscure, with a slowly-developing tumor beginning on one or the other side.

—(Dorland's *Obstetrics.*)

3. "Tears of the perineum destroy the integrity of the pelvic floor and result eventually in rectocele, cystocele, hemorrhoids, and displacements of the pelvic organs. If the tear involves the sphincter ani, incontinence also results. Lacerations of the cervix retard or check involution of the uterus and predispose to endometritis, menorrhagia, displacements, eversion of the cervical mucous membrane, cystic degeneration, and malignant disease. Deep lacerations of the vaginal vault may open into the base of the broad ligaments, and in the majority of instances genito-urinary fistulas are caused by traumatisms of labor. All lacerations are immediately dangerous on account of the increased liability to sepsis, while the remote results are generally due to interference with involution or the pelvic circulation and to the destruction of the normal supports of the pelvis."—(Ashton's *Gynecology.*)

4. In an *incomplete abortion,* there are repeated attacks of hemorrhage, the blood being dark, offensive, and thick; the os is patulous, and may contain pieces of membrane.

placenta and clots, the uterus is large and soft; there is occasionally some colicky pain in the uterus. *Treatment* comprises the following: The physician's hands and instruments are sterilized; the patient is etherized and placed on an appropriate table, or across the edge of the bed, her buttocks resting upon a Kelly pad; the genitalia are thoroughly cleansed and a vaginal douche of mercuric chloride (1 :4,000) is given; the anterior lip of the cervix is brought down to the vulvar orifice; the cervix is dilated if necessary; the placental forceps are introduced into the uterus, and as much as possible of the ovum is removed; the uterus is thoroughly curetted, and an intrauterine douche of sterile water is given. A light tampon of iodoform gauze is placed in the vagina; the patient is then returned to bed. A strip of gauze may be placed in the uterus in cases of sharp retroflexion, to secure free drainage, and occasionally an intrauterine tampon will be necessary when the uterus refuses to contract and hemorrhage persists after the use of the curette.

5. *Second Month:* The fetus is markedly bent on itself, and the visceral clefts and arches are the most prominent characteristics of its cephalic region, while the extremities are in a very rudimentary condition. In the latter part of the month, owing to the development of the brain, the head becomes considerably larger, and assumes a certain resemblance to that of a human being. At the same time the nose, mouth, and ears become less prominent and the extremities more developed, so that it can be seen that they are made up of three portions. The external genitalia also make their appearance in the latter part of this month, and at its end the fœtus has attained a length of 1 inch."—(Williams.)

6. ECLAMPSIA. *Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:* (1) Control the convulsions (by chloroform, veratrum, or chloral); (2) eliminate the poison or poisons which are presumed to cause the convulsions; (3) empty the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

7. OCCIPUT POSTERIOR. *Diagnosis:* "Vaginal examination reveals the occiput and smaller fontanel posterior in the median line, while anteriorly the bregma is within

easy reach. The sagittal suture corresponds to the conjugate diameter of the pelvis. If the complication be the result of an imperfect perineal floor, the head will be low down in the pelvic cavity, while if it occur from some insuperable obstacle to entrance into the superior strait, it will be found resting high up upon the pelvic brim. Abdominal palpation will, in the latter class of cases, show an anterior median situation of the fetal extremities, with a transverse position of the shoulders; the head may be readily mapped out, while the fetal heart-sounds will be indistinct, and only heard far back in the flanks, or they may be altogether absent."—(Dorland.)

Management: Forceps must be applied. "In the difficult cases in which instrumental delivery is required from the beginning, the occiput becoming engaged in the posterior position, the head must be dragged down to the vulvar orifice and the outward traction continued until the brow becomes firmly fixed under the symphysis; the forceps must then be grasped in the right hand and the head lifted steadily upward until the occiput be almost on the point of emerging from the vulvar orifice, when the handles must be carried downward over the perineum, the face appearing from beneath the symphysis. In rare cases excellent results may be obtained by converting the abnormal position into a face presentation with the chin anterior."—(Dorland's *Obstetrics.*)

8. *Dangers of breech:* Pressure on cord, prolapse of cord, suffocation of child, liability of child to bruises, fractures, and trauma in general. *Management of impacted breech:* Give an anesthetic, try forceps, fillet, or cephalotribe, or blunt hook, or symphyseotomy.

9. FACE PRESENTATION. *Diagnosis:* "The unusually prominent bulk of the cranial vault is felt in one hypogastric region; a deep groove between the occiput and the child's back may often be made out. The fetal heart-sounds are loudest over the anterior surface of the fetus, or on that side of the maternal abdomen upon which the fetal extremities are felt. The diagnosis, however, must usually rest on a digital examination, which shows before the onset of labor a high situation of the presenting part; a flattening of the anterior vaginal vault; a sharp contrast between the smooth outline of the fetal forehead and the irregular contour of the face. As soon as the os is dilated, the characteristic features of the face may be felt."—*Mechanism:* The successive steps are: Extension—The head presents at the superior strait imperfectly extended, so that every case of face presentation may be said to begin as a brow presentation. There is also at first imperfect engagement of the presenting part, on account of the large diameters presented at the superior strait. Under the influence of

the expulsive action of the uterus and the resistance of the pelvic walls, the brow, caught upon the pelvic brim, is held stationary, while the chin descends lower and lower by an extreme extension of the head. Molding, or an accommodation of the shape of the presenting part to the shape of pelvis, occurs to a moderate degree or not at all, because the face is a loose fit in the normal pelvis. The molding is confined to the back of the skull. Lateral inclination is a constant feature, so that one cheek is a little deeper in the pelvic canal than the other one. Descent of the presenting part follows the dilatation of the cervical canal, the descent of the chin being accomplished almost solely by the extension of the head, and not by a descent of the head as a whole. Anterior rotation of the chin occurs as soon as it encounters the resistance of the pelvic floor. Anterior rotation is followed by the engagement of the chin under the symphysis pubis. Then follows the delivery of the head by flexion and propulsion, the mouth, nose, eyes, and forehead sweeping over the perineum and appearing successively at the posterior commissure. Restitution and external rotation follow the escape of the head from the same causes that impose those movements upon the head in a vertex presentation. The delivery of the body takes place as in a vertex presentation."—(Hirst's *Obstetrics.*)

10. *Placenta prævia. Treatment:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchment forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

Post-partum hemorrhage. Treatment: Grasp the uterus at once, through the abdominal wall, and massage it firmly. Anything in the uterus should at once be cleaned out. Pass one hand into the uterus, and with the other on the outside make firm pressure. A hypodermic of ergotin, or ergot can be given by an assistant. An intrauterine douche of hot sterilized water (about 115° F) may be given. Sometimes a very thorough packing and plugging of gauze of uterus and vagina may be necessary. Whatever is done must be done promptly; and everything likely to be needed for this emergency should be prepared beforehand in every labor.

11. (*a*) ***Funic souffle*** **is a sharp, whistling or a blowing sound, synchronous with the fetal heart beat, heard on auscultation over the pregnant uterus.**

(*b*) ***Uterine souffle*** **is a rhythmical, soft, blowing sound, synchronous with the maternal heart beat, heard on auscultation over the pregnant uterus.**

(*c*) *Ballottement* is the passive movement of the fetus

in utero, obtained by tapping the lower segment of the uterus with the index finger.

(*d*) *Hegar's sign* consists in a thinning and softening of a segment of the body of the uterus immediately above its cervix.

(*e*) *Braxton Hicks' sign* consists of intermittent contractions of the uterus at about the fourth month or pregnancy.

(*f*) *Rasch's sign* is fluctuation felt when the hand is applied to the cervix of the uterus in early pregnancy, due to the presence of liquor amnii.

(*g*) *Jacquemier's sign* is a discoloration (dark or bluish) of the vaginal mucous membrane, noticed early in pregnancy.

12. "When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility; nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy; pains are often very severe, with marked tenderness within the pelvis; such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating; this tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two fists. (4) The *os uteri* is patulous; the uterus is displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua, in part or whole. Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs.*"—(*American Text-book of Obstetrics.*)

13. Non-elimination of sufficient urinary solids, and convulsions. For treatment, see Question 6.

SURGERY.

1. *Anesthesia* is loss of sensation, or tactile sensibility; if *general*, there is also loss of consciousness. Ether and chloroform. Ether is the favorite, because it is safer as a general rule; in obstetrics chloroform is often used.

2. *Intubation.*—"The child is wrapped in a blanket to control the arms and legs, and is held upright by a nurse seated in a chair, while an assistant holds the head upon the nurse's left shoulder and prevents the mouth gag from slipping. A long piece of silk is passed through the small

opening in the upper part ofthe tube, the tube fastened to the introducer, and the silk looped around the little finger. The left index finger is passed into the throat, and lifts the epiglottis while the tube is passed along it into the glottis. The left index finger is then made to press upon the head of the tube, which is released by pulling the trigger on the introducer, which is then withdrawn. When one is assured that the tube is in the right place and that the symptoms are relieved, the silk loop may be cut and withdrawn while the finger is again made to press down on the tube."—(Stewart's Surgery.)

3. Patient is anesthetized, Syme's staff is introduced, incision is made in the midline of the perineum, exposing the staff just above its shoulder. The knife is carried along the groove and divides the stricture. A catheter is passed into the bladder from the meatus and remains in for several days; the wound is dressed antiseptically.

4. *Phimosis* is the condition of the prepuce when it cannot be retracted over the glans. Treatment is circumcision. In the operation of circumcision the prepuce is drawn well forward, and clipped with a pair of polypus forceps in front of the glans; the projecting end cut off; the cutaneous sheath allowed to retract, and the mucous membrane slit up along the dorsum as far as its attachment. Each half is then cut away, following the line of the corona, and leaving the frenum and just enough to hold a few sutures. If catgut is used, and the wound dried and covered with iodoform, the dressing may remain on until the skin has united.—(*Pocket Cyclopedia.*)

5. *Cystitis. Symptoms:* Pain in hypogastrium and perineum; constant desire to urinate, followed by pain; urine may be ammoniacal or contain blood. *Treatment:* Rest in bed, milk diet, remove cause, alkaline drinks and plenty of water, citrate of potassium or buchu.

6. *Ligation of radial artery in upper third.* The artery is in a line from a point half inch below the center of the fold of the elbow to the ulnar side of the styloid process of the radius. Make an incision two and one-half inches long in the line just mentioned, beginning one and one-half inches below the fold of the elbow. Avoiding the superficial veins, carry the incision through the cellular tissue. Recognize the edge of the supinator longus, and divide the aponeurosis along the ulnar side of it, exposing the fibres of the pronator. Press apart the two muscles if necessary, separate the artery from its veins, and pass the ligature.

7. *Fracture* is a solution in the continuity of a bone, caused by violence. *Varieties:*—Simple, compound, comminuted, greenstick, complete, incomplete, infected.

Diagnosis is made on:—History of injury, disability, pain, deformity, point of false motion, and often crepitus. *Indications for treatment:* Prevent the injury from getting worse, set the broken bone in natural position, fix the limb, keep the parts at rest.

8. The olecranon is prominent; the forearm is flexed, supinated, and shortened, the lower end of the humerus projects in front of the joint; the head of the radius is found behind the outer condyle. *Treatment:* Forced flexion, traction, and extension.

9. *Amputation through middle third of forearm.*—"An anterior and a posterior U-shaped flap are incised on the respective aspects of the forearm, the base of each flap at the saw-line being equal to a half-circumference of the limb at that line, and the length of each equal to three-fourths of the diameter—the hand being supinated in making the anterior flap, and the forearm vertical in making the posterior flap. Having cut through skin and fascia in outlining the flaps, these incisions are now deepened upon the line of the retracted skin, beginning at the ulnar side of the anterior flap, in case of the right arm (and on the radial side upon the opposite arm). The vertical ulnar incision will involve the flexor carpi ulnaris and flexor profundus—the vertical radial incision will involve the two radial carpal extensors—both vertical incisions passing directly to the bones. The muscles on the anterior and posterior aspects of the forearm, at the lower rounded extremities of the flaps, are cut from without inward in such a manner as to bevel them slightly. The entire flaps are now raised from the bones up to a point sufficiently below the saw-line to furnish a musculo-periosteal covering—at which level the periosteum is circularly divided around the bones—the interosseous membrane cut transversely—and the musculo-periosteal covering freed to the saw-line. The soft parts are then retracted and the bones sawed. The radial, ulnar, anterior and posterior interosseous arteries are tied. The median, radial, and ulnar nerves should be cut short, or even dissected from the flap. The musculo-periosteal covering is sutured and the muscles quilted—and the integuments sutured in a lateral line."—(Bickham's *Operative Surgery.*

10. BURNS. *Local Symptoms:*—Pain and inflammation. *Constitutional Symptoms:*—Weak pulse, shallow respiration, subnormal temperature. Shock. *Treatment:*—Moisten the parts with solution of sodium bicarbonate. Remove clothing with care, give morphine and stimulants, dress with boric acid and salicylic acid, keep the patient warm. The constitutional treatment is to bring about reaction, give opium for the pain, keep bowels and kidney active, give tonics and stimulants.

BACTERIOLOGY AND PATHOLOGY.

1. Staphylococcus pyogenes aureus, staphylococcus pyogenes albus, streptococcus pyogenes. They are all found in pus. In health, the staphylococcus pyogenes aureus is found on the skin, mouth, under nails, nose; the streptococcus is found in the nasal cavities, skin, urethra, mouth, vagina; the staphylococcus albus, also on the skin. For ordinary use a saturated alcoholic solution of methylene blue 30 per cent. in solution of potassium hydroxide 1 :10,000.

2. The *characteristics of the bacillus of diphtheria:* The bacilli are from 2 to 6 mikrons in length and from 0.2 to 1.0 mikron in breadth; are slightly curved, and often have clubbed and rounded ends; occur either singly or in pairs, or in irregular groups, but do not form chains; they have no flagella, are non-motile, and aërobic; they are noted for their pleomorphism; they do not stain uniformly, but stain well by Gram's method and very beautifully with Loeffler's alkaline-methylene blue.

A sterile swab is rubbed over any visible membrane on the tonsils or throat, and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it and placed on a clean cover slip and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appear as short, thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts.

See HYGIENE, 4.

3. There are no distinctive lesions in scarlet fever; the hyperemia disappears after death; certain protozoa may be found in the skin; cervical lymphatic gland may be enlarged; bronchopneumonia, endocarditis, pericarditis, pleurisy and pneumonia may be found; spleen and liver may be enlarged.

Complications: Nephritis, endocarditis, pleurisy, peritonitis, chorea, hemiplegia, mania, paralysis, otitis media, adenitis.

4. *Tumors are classified as follows:*

I. Those derived from mesoblast:

(*a*) *Benign:* Lipoma, fibroma, chondroma, osteoma,

myxoma, myoma, neuroma, glioma, angioma, lymphangioma.

(*b*) *Malignant:* Sarcoma.

II. Those derived from epiblast or hypoblast:

(*a*) *Benign:* Adenoma, papilloma.

III. Cystic tumors.

IV. Teratomata.

"*Myomata* almost always consists of *untsriped* muscle fibres, forming rounded and often encapsuled tumors, the cells of which are long and fusiform and contain a rod-like nucleus. Bundles of these cells are grouped together into fasciculi, which are arranged more or less regularly. The tumors themselves are not very vascular, but vessels of considerable size are found in the capsule. It is often difficult to distinguish these tumors microscopically from fibromata on the one hand, and from fibrosarcomata on the other. From the former they are known by the fact that individual cells can be recognized, and by the absence of wavy tendinous fibrillæ; from the latter the distinction depends on the facts that other types of tissue may occur in the sarcoma, and that the growing edge is usually more or less embryonic in character, while a myoma is of the same structure throughout. Again, in a myoma the blood-vessels have distinct and definite walls, and in a sarcoma they are simply clefts or passages in the tumor substance.

"*Clinically,* epithelioma may be looked upon as a *malignant wart,* which not only grows outward from the surface, but also burrows deeply into adjacent tissues; sooner or later ulceration follows. Several characteristic forms are described: (*a*) It may occur as a nodular indurated mass, with hard everted edges and central ulceration, giving rise to a somewhat crateriform ulcer. (*b*) The destructive process may extend equally with the new formation, leading to the appearance of a depressed sore, with sharply-cut edges, closely resembling a rodent ulcer. (*c*) Occasionally a superficial outgrowth is excessive, and the destructive process limited, giving rise to a projecting cauliflower-like mass, which is soft and easily bleeds (*malignant papilloma*). (*d*) A chronic epithelioma is sometimes seen, in which the fibrous stroma contracts and compresses the columns of epithelial cells: the surface is then indurated and wart-like, with but little ulceration, while the base is very hard, and the progress of the case much less rapid than in other forms."—(Rose and Carless.)

5. *Mitral insufficiency* is due to thickening, retraction, or deformity from vegetations, of the valve-curtains; adhesion of the curtains to each other or to the ventricular wall; and calcareous degeneration. In some instances one of the valves is perforated or torn; and sometimes the

tendinous cords are shortened and thickened, or ruptured as the result of degeneration, preventing the normal action of the valve-curtains. In rare cases associated with dilated ventricle, the papillary muscles are so weakened by degeneration that they can no longer aid in the closure of the orifice. Dilatation of the left auriculo-ventricular orifice is also a cause of *relative* mitral insufficiency. This form is unconnected with structural valve-changes, and is due to defective muscular contraction, such as occurs in anemia, typhoid fever, and the failing systole of the later stages of aortic insufficiency.

MEDICAL JURISPRUDENCE.

1. (*a*) In gunshot wounds by *soft lead bullets*, the *wound of entrance* is often smaller than the ball (skin stretched at the moment of impact and contracted after perforation); it is depressed, and the edges are contused and inverted, and if the weapon is fired within ten feet usually are blackened from powder and contain powder grains. If the wound is much larger than the bullet it means that some foreign body has been carried in.

The *wound of exit* is everted, "triangular, linear, or stellate," and much larger than the wound of entrance.

(*b*) In gunshot wounds by *hard lead or steel bullets*, the *wound of entrance* is usually as large as the ball, the skin may be split or may be perforated, and foreign bodies are not carried by the ball into the tissue.

The *wound of exit*, if not in the region of explosive action, may be a little larger or a little smaller than the bullet, but is not noticeably larger than the wound of entrance. If within the area of explosive action, the wound of exit is much larger than the wound of entrance, and is irregular and everted.—(From Da Costa's *Modern Surgery*.)

The medicolegal significance of position and direction of wound consists in the fact that by careful study of these it may be possible to differentiate between suicidal, accidental, and homicidal wounds.

2. *Post-mortem appearances in phosphorus poisoning:* "The most common and characteristic of these are the jaundiced skin and internal organs, the ecchymoses beneath the skin and mucous membranes, and the fatty degeneration of the liver, heart, and kidneys. In addition to these there is frequently fatty degeneration of the gastric epithelium and of the capillaries of the cortex of the brain. Necrosis of the jaw bone is quite often found and sometimes new formation of bone tissue. If the poison has been taken in the solid state particles may be found adhering to the mucous membrane of the stomach and bowels, and perforations are very apt to occur at these points. If paste or

match heads have been taken there may be no local inflammation, but ecchymoses and hemorrhages into the pleural cavity, pericardium, and bladder. The blood is dark and syrupy, the corpuscles disintegrated and destroyed. The yellow liver of phosphorus poisoning may be distinguished from that of acute yellow atrophy, which it sometimes resembles, by the fact that in the latter, instead of globules of fat, the cells are filled with or replaced by finely granular detritus, and the urine is loaded with leucin and tyrosin, whereas in the former but little increase in these substances is found."—(Riley's *Toxicology.*)

The chief industrial source is the manufacture of matches. The antidote is old French oil of turpentine, or solution of potassium permanganate.

3. *Effects of concentrated lye poisoning:* "A nauseous acrid taste, rapid destruction of the mucous membranes and even the deeper tissues of the mouth and throat, burning pain in the throat and stomach extending very soon to the abdomen, which becomes exceedingly tender, aphonia, vomiting of bloody mucus, frothy and with a soapy taste, pulse small and thready, surface cold and covered with a clammy perspiration, great prostration, sometimes ending with convulsions, especially with children. When potassium hydroxide has been taken it sometimes shows its specific action on the heart, causing slow, weak pulse, the patient sinking into unconsciousness. Constipation is sometimes troublesome, but generally a bloody diarrhea supervenes. The urine is scanty and alkaline, or entirely suppressed. The blood is dark and gelatinous. If the patient survives a few days, sloughing of the fauces and esophagus may occur, followed by stricture and death from exhaustion or starvation, or the stomach may have been most severely affected and death result from destruction of its functions."—(Riley's *Toxicology.*)

It belongs to the class of corrosives.

4. Exudation of plasma and leucocytes occurs, followed by fibroblasts and budding from the capillaries, thus forming granulation tissue. The dead tissues or sloughs are separated, and a red area of granulation is then exposed. The deeper layer of granulation tissue is converted into fibro-cicatricial tissue, which contracts, and so the wound gradually lessens in size. In the meantime epithelium spreads in from the edge over the surface, and so the scar is completed.

5. The presence or absence of the usual signs of pregnancy. The condition of the breasts may be of some importance. Much will depend on: (1) the time that has elapsed between the abortion and the examination of the woman, (2) the period of pregnancy when the abortion

was performed, and (3) the manner in which the abortion was performed.

6. The most important medicolegal question in connection with a will is the sanity or insanity of the testator.

7. *The order in which decomposition usually takes place in a dead body:* Mucous membrane of larynx and trachea, stomach, intestines, spleen, omentum, mesentery, liver, brain, heart, lungs, kidney, bladder, esophagus, pancreas, diaphragm, uterus.

Decomposition is hastened by: Temperature between 70° and 100° F.; moisture; air; age (in children and young people more rapidly than in adults or old people); obesity; death from accidents or violence, also in certain infectious diseases; and burial in low ground or in damp, swampy soil, or in shallow grave.

Decomposition is retarded by absence or reverse of the above conditions.

8. In *death by drowning:* The surface is pallid, the face appears tranquil, the eyes and mouth being partly open. The skin often has the appearance known as gooseskin, and, if the body has lain upward of twelve hours in the water, that of the hands and the feet is sodden by imbibition. The most important external sign is the presence on the mouth and nostrils of a fine froth (possibly blood-stained), composed of air, mucus, and the medium in which drowning took place; if the body remains three or four days in water the froth disappears. Exceptionally, fragments of weeds or other small objects may be found tightly grasped in the hands. On opening the thorax the lungs, gray in color, with reddish staining, are seen to be very voluminous, a condition known as ballooning, partly due to infiltration of the lung tissue with some of the medium in which drowning took place, and partly to true edema. The lung substance is inelastic and pits on pressure. On section, fluid and froth resembling that found on the lips exude from the divided air passages. Minute subpleural hemorrhages are not infrequently present, and the pleural cavities may contain fluid. The stomach often contains water or other liquid which was involuntarily swallowed during attempts at respiration. Occasionally some of this fluid is forced by vital action into the intestines. With one exception, the remaining appearances are those met with after death from asphyxia. The exception is constituted by the blood, which is not only dark colored and fluid, as is usual after death from asphyxia, but is also diluted by the imbibition of water from the stomach and lungs.—(Quain's *Dictionary of Medicine.*)

9. "The *general appearance* of a child that has been *born alive* at full term and respired is something like the following: The remains of the vernix caseosa are usually

seen under the axilla, and behind the ears. The eyes remain partly open, and cannot be permanently closed. The ears are not so close to the sides of the head as is the case in children born dead. The hair is perfectly dry and clean, and the swelling at the back of the head (caput succedaneum) is more prominent than in the still-born. In the *dead-born* infant who has died immediately before its birth the vernix caseosa will be found, more or less, over its entire body. The eyes are closed and the ears are in close apposition to the head. The eyelids when raised close again. The mouth is closed, and from the nostrils is often observed exudation of watery blood. The hair is glued to the head. The thorax is unexpanded and flattened, and the lungs are situated at the posterior part of the thoracic cavity; they are greater in length than in breadth, and their margins are rounded; upon pressure no crepitation is elicited. Within the trachea, which is flattened, may be found a viscid mucous secretion. The remnant of the umbilical cord appears fresher looking than that of a child that has survived its birth a few hours."—(Herold's *Legal Medicine.*)

10. Mr. A. may have died of heart disease, apoplexy, thrombosis, embolism, or aneurysm. We decline to guess at the hour of his death.

STATE BOARD EXAMINATION QUESTIONS.

TENNESSEE STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Describe the portal system.
2. Name the ductless glands.
3. What cranial nerve has the widest distribution?
4. Give the origin and insertion of the humeral biceps muscle.
5. Mention any one muscle that moves the humerus forward, backward or inward.
6. Describe Hunter's canal; (*a*) what passes through it?
7. Describe the periosteum.
8. What muscles are attached to the tendo Achillis?

PHYSIOLOGY.

1. Give composition and properties of chyle.
2. Give composition of the blood.
3. Describe secretion, properties, and composition of gastric juice.
4. Give the physiological anatomy of the testicles.
5. Describe the physiological anatomy of the tongue.
6. Give the physiological anatomy of the mammary glands.

7. Describe the excretion of urine.
8. Name all the enzymes required to digest bread.

PATHOLOGY.

1. What is stomatitis? Give the pathology of ulcerative stomatitis.
2. Describe any one pathological condition caused by the excessive use of alcohol.
3. Describe the pathological changes which take place in the lung in lobar pneumonia.
4. Give the pathology of parenchymatous goitre.
5. Describe the pathology of the inflammation of any one serous membrane.
6. Describe the pathology of chronic lead poison.
7. Describe the pathology of cerebrospinal meningitis.
8. Describe the pathological condition caused by the bite of a mosquito.

MATERIA MEDICA.

1. Write a prescription for chronic malaria and state how long the patient should take it.
2. Name two medicines which increase the flow of urine. The source and dose of each.
3. What is the source of digitalis and hyoscyamus? What preparation would you use and the dose of each?
4. What is the source of potassium iodide and what is the dose? Name three diseases for which you would give it.
5. Give the source of iodide of lime and iodide of soda and the dose of each.
6. What is sodium sulphate?
7. What is the source of tetanus antitoxin?
8. What is the source of cascara sagrada? What preparation would you use and what would be the dose?

CHEMISTRY.

1. Describe Esbach's albuminometer and give a quantitative test for albumin.
2. Give a chemical test for pus in the urine; (*a*) for blood.
3. What is urea? (*a*) Its estimation? (*b*) Of what significance in nephritis?
4. What are alcohols and how classified?
5. Give chemical formula for iodoform; (*a*) how prepared; (*b*) physiological effects.
6. What is a simple ether? (*a*) compound ether? (*b*) formula for sulphuric ether?
7. What is benzine? (*a*) chemical formula and properties?
8. What is arsenic? (*a*) occurrence? (*b*) preparation? (*c*) properties? (*d*) Reinsch's test for arsenic?

TENNESSEE.

OBSTETRICS.

1. Describe, anatomically, the internal generative organs of the female; (*a*) state the function of each.
2. What are the dangers of traction on the child and on the placenta?
3. What is involution? (*a*) how long a time is usually required for this process? (*b*) What causes may operate to delay or prevent it?
4. Describe the immediate care of the new-born child when from any cause the mother cannot nurse it; (*a*) give rules for artificial feeding.
5. Differentiate eutocia and dystocia. Mention important varieties of the latter and give their management.
6. In a labor otherwise normal but tedious, how soon would it be proper to interfere, and what symptoms would prompt such a course.
7. When does it become proper to perform craniotomy, and how should that operation be performed?
8. Define puerperal phlebitis and give its pathology, symptoms, and treatment.

SURGERY.

1. How would you diagnose a case of complete inguinal hernia from a hydrocele, and describe the radical cure for hydrocele?
2. Describe in full Bassini's method of operation for the radical cure of hernia.
3. Give the nature of treatment of Pott's fracture.
4. Where does senile gangrene most often occur, and what is the usual cause?
5. Give symptoms and treatment of cholelithiasis.
6. Define peritonitis. State three ways in which the peritoneum may be invaded by bacteria.
7. What are the causes and treatment of paraphimosis?
8. Differentiate dislocation of the head of the femur from fracture of the neck, and give main essentials of treatment of each.

PRACTICE.

1. Name the organic diseases of the heart. Define aortic stenosis. Give the physical signs of it.
2. Define lobar pneumonia. Give general symptoms and diagnosis. Give briefly a treatment.
3. What is the pulse? Name some of the varieties of the pulse and their significance.
4. Define acute Bright's disease. What are the most frequent etiological factors which produce this form of kidney disease? Give a treatment.
5. Define leucocytosis. Define leukopenia. Name four diseases in which the leucocytes are increased in number.

Name four diseases in which the leucocytes are normal or diminished.

6. Define diabetes mellitus. Differentiate between diabetes mellitus and diabetes insipidus. Give a diet for diabetes mellitus.

7. Define dropsy. Name four diseases which it accompanies. Given a disease producing it, how would you treat dropsy?

8. Name some of the common forms of tuberculosis. Give a modern treatment for pulmonary tuberculosis.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

TENNESSEE STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. *The portal system.* The veins of the portal system collect the blood from the digestive tract. They form a trunk, the *vena portæ*, which enters the liver and breaks up into small branches in its substance. The following veins form the portal system:

Inferior mesenteric: drains rectum, sigmoid, flexure, and descending colon. It lies to the left of its artery, and passing behind transverse part of the duodenum and the pancreas, and over left kidney, opens into the splenic vein. (The hemorrhoidal branches inosculate with the hemorrhoidal branches of the internal iliac.)

Superior mesenteric: drains small intestines, cecum, ascending and descending colon. It passes upwards in front and to right of superior mesenteric artery, in front of transverse part of duodenum, and behind neck of pancreas joins the splenic vein at the upper border of the pancreas to form the portal vein.

Splenic: commences in five or six branches in hilum of spleen; these unite to form a trunk which passes below splenic artery behind upper border of pancreas from left to right, and in front of aorta; joins superior mesenteric at a right angle.

The gastric or coronary: a large vein accompanying coronary artery from right to left along lesser curvature of stomach to cardia, where it reaches esophageal tributaries, and, passing to right behind lesser sac, opens into the vena portæ.—(*Aids to Anatomy.*)

2. *The ductless glands* are: Spleen, thyroid, parathyroids, thymus, suprarenals, carotid, coccygeal, pituitary, and pineal.

3. The tenth cranial (pneumogastric) nerve has the widest distribution.

4. BICEPS. *Origin:* Apex of coracoid process of scapula, and upper margin of glenoid cavity of scapula. *Insertion:* Back part of tuberosity of radius.

5. HUMERUS is moved *forward*, by the Biceps; *backward*, by the Triceps; and *inward*, by Teres major.

6. *Hunter's Canal* "extends from the apex of Scarpa's triangle to the opening in the adductor magnus muscle. The anterointernal boundary or roof of Hunter's canal is the sartorius and the aponeurotic expansion from the adductors to the vastus internus. It is bounded externally by the vastus internus. The adductor longus and magnus constitute its floor or the posterointernal boundary. The canal contains the femoral artery, femoral vein, the long saphenous nerve, and the nerve to the vastus internus. (Gray.)

7. "*The periosteum* is a dense, fibrous, connective-tissue membrane that covers the bone and is derived from the perichondrium of the cartilage. It is composed of two layers, (*a*) an inner layer that contains many elastic fibers and osteoblasts, or bone-forming cells, knows as the *osteogenetic layer*, and (*b*) an outer layer of coarse, white, fibrous bundles where numerous blood-vessels ramify and send branches to the Haversian canals. The periosteum is anchored to the compact bone by means of bundles of fibers (*Sharpey's fibers*) that pass concentrically or parallel to the Haversian systems."—(Hill's *Histology*.)

8. The *Tendo Achillis* is the common tendon of the Gastrocnemius and Soleus.

PHYSIOLOGY.

1. CHYLE. *Composition:* Water, proteids, fat, cholesterin, lecithin, and inorganic salts.

Properties: Chyle is a clear, colorless or slightly yellow fluid, alkaline in reaction, coagulable; during absorption it becomes creamy, owing to the presence of fat; its specific gravity is about 1006 to 1022.

2. *Physiological composition* of the blood:

1. Plasma.
2. Corpuscles { Colored. / Colorless. / Blood-plates.

The *plasma* consists of water and solids (proteids, extractives, and inorganic salts). The *red corpuscles* consist of water and solids (hemoglobin, proteids, fat, and inorganic salts). The *white corpuscles* consist of water and solids (proteid, leuconuclein, lecithin, histon, etc.).

3. *Gastric juice* is a thin, colorless fluid; acid in reaction; specific gravity about 1002 to 1010; and containing about 1 per cent. of solids. The daily secretion amounts to 10 or 15 pints. It contains: Water, pepsin, rennin, hy-

drochloric acid, chlorides (of calcium, sodium, and potassium), and phosphates (of calcium, magnesium, and iron). Its function is to change proteids into proteoses and peptones, and to curdle the casein of milk; it is also slightly antiseptic, and inverts cane sugar into dextrose and levulose.

The pepsin and rennin come from the central cells in the cardiac glands and from the cells of the pyloric glands. In both of these glands the pepsin pre-exists as pepsinogen. The hydrochloric acid is formed by the oxyntic cells. Just how a free acid is formed from the alkaline blood and lymph is not known. It has been suggested that it may occur as follows:

(1) $2Na_2HPO_4 + 3CaCl_2 = Ca_3(PO_4)_2 + 4NaCl + 2HCl$

or (2) $Na_2HPO_4 + H_2O + CO_2 = NaHCO_3 + NaH_2PO_4$;

and then $NaH_2PO_4 + NaCl = Na_2HPO_4 + HCl$.

4. The *testicles,* the essential organs of reproduction in the male, are two oblong glands, about 1½ inches in length, compressed from side to side, and situated in the cavity of the scrotum. The proper coat of the testicle, the *tunica albuginea,* is a white, fibrous structure, about ⅛ of an inch in thickness; after enveloping the testicle, it is reflected into its interior at the posterior border, and forms a vertical process, the *mediastinum testis,* from which septa are given off, dividing the testicle into lobules. The substance of the testicle is made up of the *seminiferous tubules,* which exist to the number of 840; they are exceedingly convoluted, and when unraveled are about thirty inches in length. As they pass toward the apices of the lobules, they become less convoluted, and terminate in from twenty to thirty straight ducts, the *vasa recta,* which pass upward through the *mediastinum* and constitute the *rete testis.* At the upper part of the mediastinum the tubules unite to form from nine to thirty small ducts, the *vasa efferentia,* which become convoluted and form the *globus major* of the *epididymis*; the continuation of the tubes downward behind the testicle and a second convolution constitutes the *body* and *globus minor.* The seminal tubule consists of a basement membrane lined by granular nucleated epithelium. The *vas deferens,* the excretory duct of the testicle, is about two feet in length, and may be traced upward from the epididymis to the under surface of the base of the bladder, where it unites with the duct of the vesicula seminalis to form the ejaculatory duct.—(Brubaker's *Physiology.*)

5. *Tongue.* The *substance* of the tongue is made up of intrinsic muscle-fibers, the *linguales;* it is attached to surrounding parts, and its various movements are performed by the extrinsic muscles—*e. g.,* styloglossus, geniohyoglossus, etc.

The *mucous membrane* covering the tongue is continuous with that lining the commencement of the alimentary canal, and is furnished with vascular and nervous papillæ. The *papillæ* are analogous in their structure to those of the skin, and are distributed over the dorsum of the tongue, giving it its characteristic roughness. There are three principal varieties: (1) the *filiform papillæ* are most numerous, and cover the anterior two-thirds of the tongue; they are conic or filiform in shape, often prolonged into filamentous tufts, of a whitish color, and covered by horny epithelium. (2) The *fungiform papillæ* are found chiefly at the tip and sides of the tongue; they are larger than the preceding, and may be recognized by their deep red color. (3) The *circumvallate papillæ* are rounded eminences, from eight to ten in number, situated at the base of the tongue, where they form a V-shaped figure. They are quite large, and consist of a central projection of mucous membrane, surrounded by a wall, or circumvallation, from which they derive their name. The *taste-beakers,* supposed to be the true organs of taste, are flask-like-bodies, ovoid in form, about $\frac{1}{200}$ of an inch in length, situated in the epithelial covering of the mucous membrane, on the circumvallate papillæ. They consist of a number of fusiform, narrow cells, which are curved so as to form the walls of this flask-like body; in the interior are elongated cells, with large, clear nuclei, the *taste-cells.*—(Brubaker's *Physiology.*)

6. Each mammary gland consists of an aggregation of some fifteen or twenty lobes, each of which is surrounded by a framework of fibrous tissue. The lobe is provided with an excretory duct, which, as it approaches the base of the nipple, expands to form a sinus or reservoir, beyond which it opens by a narrowed orifice on the surface of the nipple. On tracing the duct into a lobe, it is found to divide and subdivide, and finally to terminate in lobules or acini. Each acinus consists of a basement membrane, lined by low polyhedral cells. Externally it is surrounded by connective tissue, supporting blood-vessels, lymphatics, and nerves. During gestation the mammary glands become larger, firmer, and more lobulated; the areola darkens and the veins become more prominent. At the period of lactation the gland is the seat of active histologic and physiologic changes, correlated with the production of milk. At the close of lactation the glands diminish in size, undergo involution, and gradually return to their original non-secreting condition.—(Brubaker's *Physiology.*)

7. The mechanism of the *secretion of urine by the kidneys* is twofold: (1) By filtration, most, if not all, of the fluid is eliminated, and also inorganic salts; this depends upon blood pressure, and takes place in the glomeruli. (2)

By cell activity and selection, in the cells of the convoluted tubules, the urea, and principal solids are eliminated.

8. *Enzymes required to digest bread:* Ptyalin and amylopsin are the main ones; also pepsin, trypsin, and steapsin.

PATHOLOGY.

1. *Stomatitis* is inflammation of the mucous membrane of the mouth. In *ulcerative stomatitis,* the gums are red and swollen, and may become soft and necrotic, with a tendency to bleed readily. The epithelium is destroyed; ulcers form, suppuration follows, the teeth may fall out. Inflammation extends to tongue and cheek. The saliva is increased and has a bad odor.

2. In *atrophic cirrhosis:* The liver is shrunken and indurated, rough, and of a pale or yellow color: a growth of new connective tissue is disposed in broad bands which run in various directions, and by their contraction divide the liver into numerous irregular lobes. Many acini may be affected at one time. The capsule may be thickened, or adherent to the diaphragm. Jaundice is slight, and comes on late; ascites is pronounced and may occur early.

3. *Lober Pneumonia.* "(1) *Stage of engorgement.*—This is the stage of inflammatory hyperemia and edema, and it is characterized microscopically by overfullness and slight tortuosity of the pulmonary capillaries, and by swelling of the alveolar epithelium. The lung is of a dark red color; it is heavier and less crepitant than natural; it pits on pressure; and its cut surface yields a reddish, frothy, tenacious liquid.

(2) *Red hepatization.*—Here there is an exudation of liquor sanguinis and blood-corpuscles. The exuded liquids coagulate within the alveoli and terminal bronchioles, the coagulum enclosing numerous white and a few red blood corpuscles. The alveolar epithelium is swollen and granular. The lung is now much heavier than in the preceding stage, and is increased in size, so as to be often marked by the ribs. It is quite solid; sinks in water, and cannot be artificially inflated. It is remarkably friable, breaking down with a soft granular fracture. The cut surface has a markedly granular appearance, seen especially when the tissue is torn, and due to the plugs of coagulated exudation-matter which fill the alveoli. The color is of a dark reddish-brown, often here and there passing into gray. This admixture with gray sometimes gives a marbled appearance. The pleura covering the solid lung always participates more or less in the inflammatory process. It is opaque, hyperemic, and coated with lymph.

(3) *Gray hepatization.*—This stage is characterized by a continuance of the process of inflammatory cell-emigration, and by more marked changes in the epitheluim. The white

blood corpuscles continue to escape from the vessels, and the alveolar epithelium becomes more swollen and granular. The alveoli thus become more completely filled with young cell-forms, so that the fibrinous exudation is no longer visible as an independent material. The fibrinous exudation now disintegrates, and the young cells rapidly undergo fatty metamorphosis. The alveolar walls themselves, with few exceptions, remain throughout the process unaltered, although very occasionally, when this stage is unusually advanced, they may be found here and there partially destroyed. Owing to these changes, the reddish-brown color of the lung becomes altered to a grayish or yellowish white. The granular appearance is much less marked; the solid tissue is much softer and more pulpy in consistence, and a puriform liquid exudes from the cut surface of the organ. This stage, when advanced, has been termed 'suppuration or purulent infiltration' of the lung." —(Quain's *Dictionary of Medicine.*)

4. "Parenchymatous goiter is a variety in which the glandular tissues or acini undergo more or less active hyperplasia. The gland is generally uniformly enlarged, but sometimes presents lobular or nodular elevations. The tissue is ordinarily somewhat elastic, like that of the normal thyroid, but may in other instances be very firm. Occasionally cystic forms occur, and a subvariety is sometimes distinguished by the term *cystic goiter.* Microscopically there may be found merely a uniform hyperplasia of the glandular acini, without any notable change in the structure of the tissue. In other cases the acini are larger and more irregular than in the normal thyroid, suggesting the structure of an adenoma, and the term *struma adenomatosa* is applied. In most instances the acini contain but small quantities of colloid material, as is the case in the normal gland. Sometimes, however, there is abundant production of colloid, and the acini are greatly distended; the term *colloid goiter* may be applied in such instances. In certain cases the walls of the acini are destroyed and the colloid of adjacent acini runs together, forming considerable cysts. In these instances the thyroid consists of numerous cystic excavations. Changes in the interstitial connective tissue of the gland may be comparatively slight, but may in other cases become conspicuous. The capsule of the gland may be thickened, and the stroma may predominate over the glandular elements. The term *fibrous goiter* has been suggested for such cases."—(Stengel's *Pathology.*)

5. *Pathology of pericarditis.* There is hyperemia, with lack of lustre. Exudation of lymph, which coagulates and gives a peculiar "shaggy" appearance. The process might stop at this stage, causing the dry or *plastic type of peri-*

carditis. Much oftener the process goes on to the next stage. Effusion of fluid. Absorption with more or less adhesions, which may or may not subsequently hamper the heart permanently. The fluid is serous or sero-fibrinous; it may, however, be purulent or hæmorrhagic when associated with tubercle or malignant disease.—(Wheeler and Jack.)

6. *Chronic lead poisoning.* "The lead becomes deposited more or less generally in the soft tissues of the body, but especially in the nerves, muscles, and mucous membranes. Slow elimination takes place through the skin, kidneys, liver, and salivary glands. The muscles become pale, atrophied, and sometimes indurated with fibrous tissue. Parenchymatous neuritis is also found most markedly in the peripheral ends of the nerves, and the nerve-endings in the muscles are often degeneratd. Sclerosis of the arteries, especially those of the liver, and kidneys, is found in advanced cases."—(French's *Practice of Medicine.*)

7. *Cerebrospinal meningitis.* "In rapidly fatal cases there may be nothing more than intense congestion of the meninges. In those of longer duration there is an abundant whitish or yellowish fibrino-purulent deposit at the base of the brain and in the lumbar portion of the cord. The membranes are much thickened; the ventricles are dilated and contain pus or turbid fluid. The veins of Galen may be thrombosed, causing hydrocephalus."—(Wheeler and Jack.)

8. If the mosquito was infected, the patient might get malaria or yellow fever; otherwise a slight inflammation only should result.

MATERIA MEDICA.

1. *For chronic malaria:*

℞. Quininæ hydrochloridi gr. xlviij.
Ferri pyrophosphatis solubilis gr. xxiv
Arseni trioxidi gr. ss
Oleoresinæ capsici gr vj.
Misce, divide in capsulas no. xxiv.

Signa:—Take one three times a day, after meals.

This should be continued so long as malarial parasites are found in the blood.

2. *Two medicines which increase the flow of urine:* (1) Digitalis; *source,* leaves of digitalis purpurea; *dose,* two drams of the infusion. (2) Caffeine; *source,* seed of coffea arabica; *dose,* citrated caffeine, 2 grains.

3. DIGITALIS. *Source:* Leaves of digitalis purpurea. *Preparations:* Fluidextract, ♏j; extract, gr. 1/5; infusion, ℥ij; tincture, ♏xv.

HYOSCYAMUS. *Source:* Leaves and tops of hyoscyamus niger. *Preparations:* Fluidextract, ♏iij; extract, gr. j: tincture, ♏xv.

4. POTASSIUM IODIDE. *Source:* Iodine is dissolved in a hot solution of potassium hydroxide. *Dose,* gr. vijss. May be used in syphilis, pleurisy, and asthma.

5. There is no such preparation as *iodide of lime.*

Iodide of sodium (not soda) is obtained by dissolving iodine in a hot solution of sodium hydroxide. *Dose,* gr. vijss.

6. *Sodium sulphate* is a colorless, transparent solid, with a bitter, salty taste, and no odor. It is sometimes called Glauber's salt.

7. *Tetanus antitoxin* is derived from the coagulated blood of a horse which has been immunized by inoculation with tetanus toxin.

8. CASCARA SAGRADA. *Source:* Bark of rhamnus purshiana. *Preparations:* Extract, dose, gr. iv; fluidextract, dose, ℥xv; aromatic fluidextract, dose, ℥xv.

CHEMISTRY.

1. "*Esbach's albuminometer* is merely a glass tube graduated and lettered, and used for the quantitative determination of albumin. This tube is filled to the letter U with urine, if necessary previously diluted until its specific gravity is 1008 or lower, and a solution of picric acid (picric acid, 10; crystalline citric acid, 20; distilled water, 1000) is added until the level of the liquid has reached the letter R. A rubber stopper is then inserted, the tube is inverted several times to thoroughly mix the urine and test solution and is then set aside for from 24 to 48 hours. The albumin is precipitated and its height, measured by the numerals upon the scale, represents in gms. the amount of albumin present in one liter (1000 c.c.) of the urine." (Greene's *Medical Diagnosis.*)

2. Chemical test for *Pus* in the urine: Acidify the urine with acetic acid, then filter it, and treat the filter with a few drops of freshly prepared tincture of guaiacum; a deep blue color denotes the presence of pus.

Test for Blood: To the urine add a solution of potassium hydroxide to distinct alkaline reaction; heat nearly to boiling (do not boil). A red precipitate is produced.

3. *Urea* is the end product of the proteid metabolism of the body. It has the formula $CO(NH_2)_2$. It is a crystalline solid, soluble in water, colorless, odorless, with a slightly bitter taste; it is neutral in reaction, but basic in character; dilute aqueous solutions are not decomposed by boiling, but by prolonged boiling urea is hydrolyzed to ammonia and carbon dioxide; urea forms compounds with acids and also with certain salts and oxides.

Quantitative test for urea: A comparatively easy test is that of Fowler, based upon the loss of the specific gravity of the urine after the decomposition of the urea by hypo-

chlorite. "To apply this method the specific gravity of the urine is carefully determined, as well as that of the liquor sodæ chlorinatæ (Squibb's). One volume of the urine is then mixed with exactly seven volumes of the liquor sodæ chlorinatæ, and, after the first violence of the reaction has subsided, the mixture is shaken from time to time during an hour, when the decomposition is complete; the specific gravity of the mixture is then determined. As the reaction begins instantaneously when the urine and reagent are mixed, the specific gravity of the mixture must be calculated by adding together once the specific gravity of the urine and seven times the specific gravity of the liquor sodæ chlorinatæ, and dividing the sum by eight. From the quotient so obtained the specific gravity of the mixture after decomposition is subtracted; every degree of loss in specific gravity indicates 0.7791 gram of urea in 100 c.c. of urine. The specific gravity determinations must all be made at the same temperature; and that of the mixture only when the evolution of gas has ceased entirely." (Witthaus' *Manual of Chemistry.*)

In *nephritis,* urea is generally diminished, and also varies periodically.

A sudden diminution in quantity is a danger signal.

4. *Alcohols* are hydroxides of hydrocarbon redicles, and are capable of entering into double decomposition with acids to form esters and water. They are classified as monoatomic or monohydric, diatomic or dihydric, triatomic or trihydric, etc., according to the number of hydroxyl groups (OH) they possess.

5. IODOFORM. *Formula:* CHI_3. *Preparation:* By heating alcohol, iodine, and potassium bicarbonate:

$$C_2H_5OH + 2I_2 + 2KHCO_3 = 2KI + 3H_2O + 2CO_2 + 2CHI_3.$$

Physiological effects: Analgesic; disinfectant (this has been denied); it may cause delirium, mania, or collapse; it weakens and accelerates the heart.

6. An *Ether is* the oxide of a hydrocarbon radical. In *simple ethers* the radicals are the same, as $(C_2H_5)_2O$, ethyl ether; in *mixed ethers* the radicals are different, as $CH_3.C_2H_5O$, methyl ethyl ether. A *compound ether* is a substance derived from an acid by replacing the hydrogen of the acid by a hydrocarbon radical, thus $C_2H_5NO_3O$, ethyl nitrate or nitric ether; compound ethers are now generally called *esters.*

Sulphuric ether is an old (and incorrect) name for ethyl ether $(C_2H_5)_2O$.

7. *Benzine* is a derivative of methane, CH_4. It is not a definite compound, and so has no formula; but it consists of hexane, heptane, octane, etc., and is used as a solvent for paints and varnishes. It is very inflammable and has a strong and characteristic odor.

8. Arsenic is an element, with symbol As, atomic weight of 75, molecular weight of 300, valence of three or five; it generally occurs in combination with sulphur; is a brittle, crystalline solid, or an amorphous powder, insoluble in water. It is poisonous. If pure it has no odor or taste. It is used in the manufacture of fly poison, rat poison, shot, pigment, and fireworks. It is prepared by heating arsenic trioxide and charcoal.

Reinsch's test for arsenic is as follows: To the suspected fluid add a little pure HCl; suspend in the fluid a small strip of bright copper foil, and boil. If a deposit forms on the copper, remove the copper, wash it with pure water, dry on filter paper, but be careful not to rub off the deposit. Coil up the copper, and put it into a clean, dry glass tube, open at both ends, and apply heat at the part where the copper is. If arsenic is present there will appear in the cold part of the tube a mirror, which will be found on microscopical examination to consist of octahedral crystals of arsenic trioxide.

OBSTETRICS.

1. In the nulliparous adult the *uterus* is about three inches long, about two inches wide at the upper part, and about one inch thick. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine and rectouterine. The *Fallopian tubes* are about 4½ inches long, situated in the broad ligament, and extending from the upper corner of the fundus of the uterus, outward to the pelvic wall. Their caliber is larger at the outer fimbriated end than at the inner end.

The *ovaries* are almond shaped bodies situated below the outer end of the Fallopian tube, and between the layers of the broad ligaments.

The *vagina* is a muscular tube extending from the uterus to the external surface. The anterior and posterior surfaces are in apposition. The anterior wall is about 3½ inches long, the posterior, about 4½ inches.

Function of ovaries: To develop ova, and an internal secretion.

Function of Fallopian Tubes: To carry ova to the uterine cavity.

Function of uterus: To receive, and lodge the fecundated ovum; to retain the fetus till it is mature, then to expel it.

Function of vagina: During coitus it receives the penis; during parturition it becomes part of the birth canal; it also serves as a channel for the escape of the menstrual and other uterine secretions.

2. *Traction on the child* may cause abrasions, contusions, laceration of skin, depression or fracture of cranial bones, laceration of blood-vessels, temporary facial paralysis from injury to facial nerve.

Traction on the placenta tends to pull the placenta flatwise (like a button in a button hole) and thus obstructs its egress, also to cause inversion of the uterus, and to tear cord or placenta and leave portion of placenta behind.

3. *Involution* is the process by which the uterus, after labor, returns as far as possible to the condition in which it was before impregnation. It usually takes about eight weeks. It may be delayed or hindered by: Too early getting up, too frequent pregnancies, congestion of uterus, misplacement, mismanagement of labor, sepsis, tedious labors.

4. *Artificial feeding.* "If the mother cannot nurse her infant, it must be nourished by a wet-nurse. When none can be obtained, give cow's milk one part (by measure) to two parts of water and add milk sugar, 3iv to each pint of the mixture, the proportion of milk to be increased with age. When this food disagrees, and the child passes lumps of undigested curd, one-third of the water may be exchanged for limewater. The water must be sterilized by boiling, and the milk not by boiling, which impairs its nutritive value, but by Pasteurization, *i. e.,* by keeping it continuously for thirty minutes at a temperature of 167° F. It is of the utmost importance that nipples, bottles, and vessels in which the food is prepared should be kept aseptically clean. They must not be used twice without being thoroughly cleansed—the bottles and vessels scalded and the nipples immersed in a solution of boric acid. The best rule as to how much of the milk-mixture should be given the child at one time, is to give it as much as it will readily take; if it rejects any, give it less next time."—(King's *Obstetrics.*)

5. *Eutocia* is normal labor which terminates without artificial aid and without injury to mother or fetus.

Dystocia is labor which without artificial aid would be difficult or impossible, or dangerous to mother or fetus.

Dystocia: Face and transverse presentations; deformed pelves; prolapsed cord; placenta prævia; eclampsia; precipitate labor; uterine inertia.

6. It is not a question of *time,* but of the *condition of the woman.* When no progress is made, and the uterine contractions become more feeble, the os does not dilate more, the pulse becomes feeble or frequent, pain is con-

tinuous and severe, sleep is lost, digestion is impossible—it is probably time to interfere.

7. *Craniotomy.* "Consists in perforating the skull and evacuating its contents, thus securing sufficient reduction in size to accomplish delivery. Crushing should rarely be resorted to. The indications for craniotomy are: (1) If the child is dead, and by the operation the mother can be saved risk or injury; (2) in faulty cephalic presentations, as face or brow with chin persistently posterior; (3) when there is great disproportion between the fetal head and the maternal pelvis. Various instruments are recommended, but in case of necessity craniotomy may be performed by perforating the skull with sharp-pointed scissors and extracting with forceps."—(Gould and Pyle's *Pocket Cyclopedia.*)

8. *Puerperal phlebitis* "is a very grave form of puerperal sepsis in which there occurs an acute inflammation of the venous channels of the uterine walls, with septic infection of the thrombi that normally block up their mouths; these thrombi, undergoing a rapid disintegration, induce general or localized embolisms. Beginning in a septic infection and inflammation of the uterine sinuses, the disease quickly spreads to the adjacent vessels in the pelvic connective tissue. Small emboli escape into the general circulation, inducing either a general pyemia with multiple abscess-formation, or causing localized thromboses in various portions of the body. Occasionally there occurs a rapid extension of the disease to the iliac and femoral veins, resulting in the familiar complication, phlegmasia alba dolens."—(Dorland.)

It gives a high, irregular fever; rapid pulse; great depression; no tenderness. The uterine cavity should be disinfected; rest and stimulation are indicated.

SURGERY.

1. See table on page 626, *Radical cure for hydrocele:* Incise the sac, dry its interior with gauze, swab it out with pure carbolic acid, pack with iodoform gauze, and dress antiseptically.

2. *Bassini's operation:* "An incision 2½ inches long is made over the inguinal canal, exposing the structures of the cord and the external oblique. The external oblique fibers are split from the apex of the external ring to expose the canal. The sac is found, opened, emptied of its contents, and isolated from the structures of the cord up to the internal ring. If the hernia is irreducible, the intestine is freed and returned to the abdomen, omentum being ligatured and removed. The neck of the sac is then transfixed and tied with silk, and the fundus removed. The stump returns to the abdomen, three or four stitches are then passed through the conjoined tendon and arched

	COMPLETE INGUINAL HERNIA	CONGENITAL HYDROCELE.	ACQUIRED HYDROCELE.
1. Location	Swelling continuous with inguinal region.	Same as hernia.	Swelling terminates at upper end of scrotum, can feel cord above tumor.
2. Impulse	Distinct on coughing.	No impulse.	No impulse.
3. Translucency	Not translucent, as a rule. Rarely so in children.	Translucent.	Translucent unless greatly thickened sac.
4. If reduced	Feel gurgling if contains intestine, reappears rapidly on coughing.	Reduction very slow. Reappears slowly.	Cannot be reduced.
5. Relation to testis and cord	Lies above or in front of testis and in front of cord.	Same as in hernia.	Lies in intimate relation to testis, latter felt usually below and behind tumor.
6. Palpation and percussion.	Soft, semi-elastic; dull if omentum; tympanitic if intestine.	Harder and more tense; dull on percussion.	Pear-shaped swelling; harder and tense; dull on percussion.

(Eisendrath's *Surgical Diagnosis.*)

fibers of the internal oblique and transversalis muscles above, and the deep part of Poupart's ligament below. These are tied behind the cord. The external oblique is then sutured in front of the cord, leaving just sufficient opening for it to pass through without pressure. The skin is then closed by a continuous stitch. The patient should be kept in bed for three weeks, and should not exert himself for at least six weeks. If the wound has suppurated, or if the case is one in which the abdominal muscles are weak, it is advisable that a light truss should be worn afterwards for six months."—(*Aids to Surgery.*)

3. *Pott's fracture* "consists in fracture of the fibula slightly above the malleolus and displacement of the foot outward, with rupture of the internal lateral (deltoid) ligament, or fracture of the tip of the internal malleolus, which is commoner. If the foot is taken in the hand, the leg above the malleolar region being fixed, an abnormal lateral displacement may be produced, together with abduction of the foot to an unusual degree. The fractured edge of the tibia stands out very prominently, the skin over it being tense. This injury is a very serious one, even if uncomplicated by being compounded.

Treatment: An anesthetic should always be given to accomplish reduction, as it is of the utmost importance that perfect replacement be effected. The foot is sometimes displaced backward as well as outward, and this must be carefully considered in effecting reduction. A dressing should now be applied that will hold the foot in a slight varus position, and at the same time permit ready and daily inspection. The old straight splint of Dupuytren serves this purpose well. During the first two weeks the dressing should be removed every three or four days, with a view to insuring the continuance of good position, and for the purpose of massage and instituting gentle passive movements. After the second week, when good position is assured, plaster-of-Paris may be applied, extending from the knee to the tips of the toes. After five weeks, ordinarily, the splint may be removed."—(*Pocket Cyclopedia.*)

4. Senile gangrene most often occurs in a toe or a foot. It is due to feeble heart action and atheroma or endarteritis obliterans of the peripheral vessels.

5. CHOLELITHIASIS. *Symptoms:* "While the calculus remains free in the gall-bladder, usually there are no symptoms. Impaction of the stone in the common duct gives rise to intermittent jaundice, following sharp pain in the right hypochondriac or epigastric region, frequently radiating toward the right scapula, nausea, vomiting, sweating, depression, and often intermittent fever (Charcot's intermittent fever). When the stone is impacted in the cystic

duct, jaundice is less common, but the hepatic colic is severe, and dropsy of the gall-bladder may occur. The diagnostic points are the age, sex, history of previous attack, with jaundice and intermittent fever, location of the pain, dark, amber-colored urine, contining bile, and sometimes the finding of the stone in the feces."

Treatment "includes the relief of pain by morphine (gr. ¼) and atropine (gr. 1/125), hypodermically, inhalations of chloroform, hot applications, and blisters over the seat of pain, and, later, a saline purgative. During the interval the diet should be largely liquid, and drugs such as sodium phosphate, sweet oil, chloroform, piperazin, and mineral waters should be administered. Constipation should be avoided by giving fluid extract of cascara (3½) and glycerin (3½) every night. Lavage and rectal irrigation may be practised. If the attacks become more frequent and severe and medical treatment fails, surgical interference (cholecystotomy) is indicated."—(Gould and Pyle's *Pocket Cyclopedia.*)

6. *Peritonitis* is inflammation of the peritoneum. Bacteria may invade the peritoneum by an abdominal wound, by extravasation from the intestine, and by way of the Fallopian tube.

7. *Paraphimosis* is due to the narrow orifice of the prepuce getting behind the corona. It might be caused by violent coitus, venereal infection, inflammation. *Treatment* consists in immediate replacement of the prepuce. In early cases reduction can usually be effected by oiling the parts well, and drawing the foreskin forward with the index and middle fingers of the two hands, while the thumbs compress the glans; or the penis may be wrapped round with lint, and gently squeezed in the hand until the edema disappears; but in some cases division of the constricting band will be necessary.

8. In the *dislocation,* the acetabulum will be empty, and the head of the bone will be out of place. The leg is flexed, adducted and inverted. There is no crepitus. In the *fracture,* the acetabulum will contain the head of the bone; crepitus may be obtained; the leg is rotated outward.

Treatment of fractures: The patient should be anesthetized, and traction kept upon the leg during fixation. A stirrup extension is first put on, and then the leg is firmly bandaged to a long Liston splint, with the eversion corrected. The chest is fixed to the splint by a binder; the foot of the bed is raised, and a weight of 8 or 10 pounds is put on to the cord of the stirrup extension. Hodgen's splint may also be used. Union occurs in six weeks.

Treatment of dislocation: The patient is placed on a mattress on the floor and anesthetized. The leg and thigh are flexed in the position of adduction. This rolls the

head down to the lower part of the acetabulum. The leg is then circumducted outwards and brought down straight; this carries the head through the rent into the acetabulum. Failing success by this method, the body must be fixed and direct upward traction must be exercised upon the flexed thigh. As a rule these maneuvers are successful; if not extension by pulleys must be made use of.

PRACTICE.

1. Mitral regurgitation, mitral stenosis, aortic regurgitation, aortic stenosis, pulmonary regurgitation, pulmonary stenosis, tricuspid regurgitation, tricuspid stenosis; hypertrophy and dilatation of the heart.

Aortic stenosis is a narrowing of the aortic orifice. *Signs:* Apex beat may be displaced downward and outward; palpation shows a thrill; the area of dullness is slightly increased; auscultation shows a harsh, rough systolic murmur, heard loudest at the base, but audible over the whole precordial region, and transmitted to the great vessel.

2. *Lobar pneumonia* is an acute infectious disease, generally due to the diplococcus pneumoniæ, characterized by inflammation of lungs, fibrinous exudation, and following a more or less typical course.

General symptoms: Chill, sudden, sharp pain in side, rise of temperature (which falls by crisis about ninth day), dyspnea, shallow and rapid breathing, cough, rusty, tenacious sputum, flushed face, furred tongue, constipation, scanty urine, leucocytosis.

Treatment: Rest in bed, liquid or semi-liquid diet, cotton jacket over chest, veratrum viride during stage of congestion, digitalis during stage of consolidation, strychnine and ammonia are useful.

3. *Pulse* is the rhythmical dilatation of an artery due to the increased volume of blood thrown into the vessel by the cardiac systole.

Tachycardia is found in: Exophthalmic goiter, fevers, heart diseases.

Bradycardia, in jaundice, aortic stenosis, some brain diseases.

Intermittent pulse, in myocardial disease, dyspepsia, excessive use of alcohol or tobacco.

Irregular pulse, in mitral regurgitation.

Dicrotic pulse, in typhoid fever.

Corrigan's pulse, in aortic regurgitation.

Small pulse, in mitral stenosis, Bright's disease.

4. *Acute Bright's disease* is an acute inflammation of the kidney, chiefly involving the epithelium of the glomeruli and tubules.

Etiology: Exposure to wet and cold; fevers (scarlet,

especially); poisons as cantharides or turpentine or alcohol; pregnancy.

Treatment: Rest in bed, warmth, milk diet, plenty of water to drink, salines, alkaline diuretics, avoidance of much nitrogenous food.

5. *Leucocytosis* is an increase in the number of white blood cells.

Leucopenia is a reduction in the number of white blood cells.

Four diseases in which the leucocytes are increased: Leukemia, pernicious anemia, diseases of the lymphatic glands, and inflammatory conditions.

Four diseases in which the leucocytes are normal or diminished: Typhoid, malaria, influenza, and measles.

6. *Diabetes mellitus* is a disorder of metabolism, of unknown origin, and characterized by the voidance of a great quantity of urine containing sugar; and loss of flesh and strength.

Diabetes insipidus is simply polyuria; no sugar is present in the urine.

Diabetic diet: Sugars and starches must be avoided. Aleuronat bread should be used. Saccharin may be used; liver, pastry, potatoes, beets, syrups, cornstarch, biscuits, chocolate, cocoa, and most liquors should be avoided. Meat, game, fish, light broths, eggs, are allowed.

7. *Dropsy* "is the accumulation of a watery fluid in one or more of the serous cavities, or a diffusion of such fluid through the areolar tissue of the body or its organs, or a combination of these conditions."—(Butler.) It may be found in heart disease, nephritis, cirrhosis of the liver, and aneurysm.

Treatment of dropsy: Hydragogue cathartics, diuretics (unless contraindicated), paracentesis.

8. *Some common forms of tuberculosis:* Acute miliary tuberculosis, pulmonary phthisis, fibroid phthisis, tuberculosis of serous membranes, tuberculosis of lymphatic glands, tuberculosis of genitourinary organs.

Treatment consists largely in the liberal use of fresh air, sunlight, pure water, good food, exercise, hygiene, etc. The digestion should receive attention, and nitrogenous and fatty elements should predominate in the diet. Creosote and other drugs of this class, together with iodine and its preparations, are especially beneficial. Oxygen, nitrous oxide, have been used with benefit. The general nutrition of the patient should be maintained by the use of strychnine, arsenic, iron, cod-liver oil, hypophosphites, etc. Night sweats may be prevented by atropine, picrotoxin, ergot, aromatic sulphuric acid, and sponging with alum in alcohol. Hemorrhage may be controlled by rest, the application of an ice-bag to the chest, and the administration of

ergot, morphine, gallic acid, atropine, calcium, chloride, etc. Fever is best treated by rest and cold applications. Cough may be checked, when excessive, by administration of opium, or hydrocyanic acid.

STATE BOARD EXAMINATION QUESTIONS.

Texas State Board of Medical Examiners.

ANATOMY.

1. Describe the clavicle.
2. Describe the elbow joint.
3. Give origin and insertion of the following muscles: Posterior tibial, flexor carpi radialis.
4. Describe the internal iliac artery; give relations of anterior tibial artery.
5. Describe the vagus nerve.
6. Name and locate the ductless glands.
7. Give relations and nerve supply of kidney.
8. Describe the lower lobe of the left lung.
9. Name the ligaments of the uterus.
10. Briefly describe the common bile duct.

HISTOLOGY.

1. Give the relation of the various constituents of the blood to each other.
2. Give the diagram of a cross-section of the shaft of the humerus. Describe the Haversian system and show the relation of the parts to each other.
3. Give the constituents of bone relative to the organic and inorganic parts.
4. Define cartilage. Define the following cartilages and tell where found: (*a*) Hyaline; (*b*) White; (*c*) Interarticular; (*d*) Connecting; (*e*) Circumferential; (*f*) Stratiform; (*g*) Reticular.
5. Describe striped and unstriped muscle, and name organs in which unstriped is found.
6. Where is the (*a*) Axiscylinder Purkinje? (*b*) White substance of Schwann? (*c*) Neurilemma?
7. What is the relative difference between the sympathetic and cerebrospinal fibers?
8. Name the layers of the skin from within outward.
9. Name the coats of the arteries and give structural difference.

PHYSIOLOGY.

1. Name and classify the principal nerve upon which the function of voice depends.
2. In what three important organs of the body is the existence of vasomotor nerves still an uncertainty?
3. Give function of the gall-bladder; state whether or not

the flow of bile into the duodenum, in the normal subject, is continuous and uniform.

4. Give the principal factors controlling the flow of lymph; in what respect does its circulation differ from that of the blood?

5. Give the four principal ways in which heat is regularly lost from the body and the percentage of each.

6. Give definition of a carbohydrate; give four functions of carbohydrate foods.

7. Give specific gravity, chemical reaction, average daily quantity, and constituents of normal urine.

8. Give chief source, average daily quantity excreted, and where formed of urea.

9. As it applies to caisson work and in the therapeutic use of oxygen, give the effect of breathing (*a*) condensed (*b*) rarefied air; give symptoms of increased and decreased percentages of oxygen.

10. Give specific gravity and chemical reaction of gastric juice; name its principal enzymes and give action of each in the process of digestion.

CHEMISTRY.

1. When is an element in what is called the "nascent" state?

2. Define catalysis.

3. Give a brief summary of the "ion" theory.

4. Describe a reliable test for free hydrochloric acid in the stomach contents.

5. Describe "Gmelin's" test for bile in the urine.

6. Describe a practical test for each of the following: (*a*) albumin, (*b*) sugar, (*c*) indican, in suspected urine.

7. Give (*a*) symptoms of poisoning from, (*b*) treatment of same, (*c*) quantity sufficient to cause death, and (*d*) a test of iodine.

8. State (*a*) fatal dose, (*b*) symptoms of poisoning from, and (*c*) a test for cyanide of potassium.

9. Salicylic acid is sometimes used as a preservative. Say how you could detect it in a food or beverage.

10. Give (*a*) symptoms, (*b*) treatment, and (*c*) a test for acetanilid poisoning.

BACTERIOLOGY.

1. Name the organism that causes gonorrhea.

2. What important disease is caused by the Klebs Loeffler bacilli?

3. What is antitoxin? How is diphtheritic antitoxin prepared?

4. Describe the process of staining tubercle bacilli in sputum.

5. Name the most important pus-producing bacteria.

6. What important disease is produced by the *Amœba coli*?
7. What microorganism causes tetanus, and why is it so necessary to open up punctured wounds immediately after the reception of injury?
8. What microorganism is considered the cause of erysipelas?
9. What temperature is required for the growth and cultivation of all disease-producing bacteria?
10. What microorganism causes influenza?

PHYSICAL DIAGNOSIS.

1. Name and describe the physical signs in the three stages of croupous pneumonia.
2. Physical signs of chronic interstitial pneumonia.
3. Physical sign of pneumonokoniosis.
4. Physical signs of cardiac hypertrophy.
5. Physical signs of cardiac dilatation.
6. Physical signs of serofibrinous pleurisy.
7. Physical signs of aortic regurgitation.
8. Physical signs of plastic pericarditis.
9. Give differential diagnosis, from physical signs, of acute dilatation of the heart and pericarditis with effusion.
10. Define and describe amphoric respiration, and state of what condition this breathing is pathognomonic.

PATHOLOGY.

1. Name some of the varieties of degeneration.
2. Name some of the results of endocarditis.
3. Define endarteritis. What are the dangers to the tissues in endarteritis obliterans?
4. Name the blood and glandular changes in leukemia.
5. How would you distinguish between fatty degeneration and fatty infiltration?
6. What two pathological conditions result from altered secretion of the thyroid gland?
7. What do you understand by the union of a wound by first intention?
8. Name the common malignant tumors of the breast.
9. Define the difference between a thrombus and an embolus.
10. What is the pathology of typhoid fever?

OBSTETRICS.

1. Give signs and symptoms of pregnancy.
2. Give symptoms and signs of approaching labor.
3. Name the diseases from which a mother should be carefully protected before and after labor. (*b*) Explain protective measures.
4. Give, in detail, management of a normal labor.

5. Give types of placenta prævia and their treatment.
6. What would you do if the waters were drained off and a hand and foot were found presenting together?
7. (*a*) In case of twins, if the first came feet first, what special care should you take in delivering the head? (*b*) Why?
8. Define puerperal eclampsia. (*b*) Give treatment before, during, and after labor.
9. State how you would manage an infant after its birth. (*b*) What attention should the babe's eyes receive?
10. Give explicitly the treatment of abdominal pregnancy from conception to termination of pregnancy.

GYNECOLOGY.

1. Define ectopic gestation and mention three of the most important diagnostic symptoms of tubal pregnancy.
2. If a tubal pregnancy is diagnosed before rupture, what treatment would you advise? Describe technique of operation for tubal pregnancy.
3. (*a*) Mention three pathological types of endometritis. (*b*) In what class of patients would you suspect that an exciting endometritis was tuberculous, and what steps would you take to confirm the diagnosis?
4. What diagnostic significance would you attach to postmenopause hemorrhage from the uterus?
5. Mention three of the earliest symptoms of cancer of the cervix uteri, and mention three other conditions of the cervix with which it might be confused.
6. Give three clinical symptoms of retroversion of the uterus and indicate treatment.
7. Mention five distinctly diagnostic symptoms of carcinoma of the breast.
8. When should lacerated perinea be repaired, and why? Give a brief reason for your answer to this question.
9. (*a*) What are the clinical symptoms of dysmenorrhea? (*b*) Mention four types of dysmenorrhea.
10. Briefly describe a typical case of chronic pyosalpynx and differentiate it from appendiceal abscess and tubal pregnancy.

SURGERY.

1. How would you manage a fracture of the lower and middle third of the shaft of the femur?
2. Give differential diagnosis of luxation of the hip and fracture of the surgical neck of the femur? Give methods of managements of each.
3. Give indications for gastroenterostomy. Give operative technique.
4. When and why would you advise the drainage of the

gall-bladder? Give indications for extirpation of gall-bladder and give operative technique of the extirpation of the gall-bladder.

5. Give differential diagnosis of concussion and compression of the brain. Give indications for trephine. Give operative technique.

6. Give indications for ligation of middle meningeal artery. Give location and operative technique.

7. Give operative technique for acute, non-suppurative appendicitis; acute suppurative appendicitis; acute perforative or gangrenous appendicitis without abscess; acute perforative or gangrenous appendicitis with abscess.

8. Give clinical symptoms of floating or movable kidney and operative technique for nephrorrhaphy.

9. With no union for three months after compound-comminuted fracture below knee, where there were necrosis and suppuration, would you or would you not advise amputation? Why? Give operative technique.

10. Give clinical symptoms of empyema. Give operative technique.

HYGIENE.

1. Explain the difference between contagious and infectious diseases and give examples.

2. What infectious or contagious diseases are communicated through the medium of the air? What through foods? What by insects? What method can you suggest for combating the latter?

3. Explain the presence of hookworm in the body. What do you recommend to lessen the prevalence of the disease?

4. Name five diseases commonly regarded as requiring regulation by quarantine and state the time necessary to maintain same in each case.

5. What methods would you employ to determine the cause of an epidemic of typhoid fever in your community?

6. Given a case of diphtheria to attend, outline in detail what measures you should adopt to protect the community against an epidemic.

7. How would you determine whether drinking water and milk suspected of being unfit for domestic use was safely pure or not? What precautions should be advised pending such decision?

8. Name three reliable fumigation agents and give detail for procedure for the use of one of them following a contagious case.

9. What hygienic measure should be observed in the management of pulmonary tuberculosis?

10. What precautions should be taken to secure and maintain a pure supply of cistern water?

MEDICAL JURISPRUDENCE.

1. Define insanity and give the best classification for legal purposes.
2. What do you understand by "superfetation" and how distinguished from twin pregnancies?
3. Define and give differences between impotence and sterility.
4. What are the elements of responsibility in criminal malpractice, and the relief from such responsibility?
5. How should blood stains be studied? And how would you distinguish the human blood globule from that of other sources?
6. In order to convict for infanticide, give four positive elements of criminality that the law requires.
7. What are the post-mortem signs found in the newborn after asphyxia? After strangulation? After starvation and exposure?
8. Describe death from electricity and give post-mortem appearances. Where does the medicolegal interest come in?
9. Describe in very minute detail an autopsy.
10. Define rape and tell what three conditions are necessary to be produced by medical testimony to prove rape.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

TEXAS STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *clavicle* forms the anterior part of the shoulder girdle; it articulates internally with the first part of the sternum, and externally with the acromion process of the scapula. It is broad and flattened at its outer end, and thick and rounded at the inner end. It consists of a double curve, the outer part is concave forward, the inner part convex forward. The bone has two surfaces, superior and inferior, and two borders, anterior and posterior. On the under surface are the conoid tubercle, a groove for the subclavius, a rough impression for the rhomboid ligament. *Muscles attached to it* are: Deltoid, trapezius, pectoralis major, subclavius, sternomastoid, and sternohyoid. *Ligaments attached to it* are: Interclavicular, rhomboid, conoid, trapezoid, and capsular (of sternoclavicular and acromioclavicular articulations).

2. The *elbow-joint* "is a ginglymoid articulation formed above by the lower extremity of humerus, below by upper extremities of ulna and radius. Its ligaments are external and internal lateral, anterior and posterior ligaments. *External lateral* arises from external condyle of humerus and is inserted into outer margin of ulna. *Internal lateral,*

much stronger, consists of two portions; *anterior* arises from fore part of internal condyle to be inserted into coronoid process, and *posterior* from back part of condyle to inner margin of olecranon. *Anterior* ligament arises above coronoid fossa, and is inserted into coronoid process of ulna and orbicular ligament. *Posterior ligament,* attached above olecranon fossa, and below to olecranon process of ulna. The anterior and posterior ligaments become continuous with the lateral to encircle the joint."—(Young's *Anatomy.*)

3. POSTERIOR TIBIAL. *Origin:* Posterior surface of interosseous membrane, outer portion of posterior surface of shaft of tibia, and upper part of internal surface of fibula. *Insertion:* Tubercle of scaphoid; three cuneiforms, cuboid, and second, third, and fourth metatarsal.

FLEXOR CARPI RADIALIS. *Origin:* Inner condyle of humerus, inner margin of olecranon process of ulna, and upper part of posterior border of ulna. *Insertion:* Pisiform, unciform, and fifth metacarpal.

4. The *internal iliac artery* arises at the bifurcation of the common iliac artery, and passes downward to the margin of the great sacro-sciatic foramen, where it divides into the anterior and posterior trunks. It supplies the walls and viscera of the pelvis, the genital organs, and the inner side of the thigh. It is about an inch and a half in length.

RELATIONS OF ANTERIOR TIBIAL ARTERY. *In front:* Skin, fascia, tibialis anticus, extensor proprius pollicis, extensor longus digitorum, anterior annular ligament, anterior tibial nerve. *Behind:* Interosseous membrane, tibia, and anterior tibiotarsal ligament. *Externally:* Extensor proprius pollicis, extensor longus digitorum, and anterior tibial nerve. *Internally:* Tibialis anticus, and tendon of extensor proprius pollicis.

5. *Pneumogastric nerve. Superficial origin:* Groove between restiform and olivary bodies. *Deep origin:* Nuclei in floor of fourth ventricle. *Course:* Outward across the flocculus, to jugular foramen through which it passes, here it is joined by the accessory portion of the spinal accessory nerve. As it goes down the neck it lies in front of the *rectus capitis anticus* major and longus colli muscles. It passes in the carotid sheath behind and between the artery and vein. In the thorax the nerve on each side runs a different course. The *right* passes between the subclavian artery and vein, by side of trachea to root of lung, behind esophagus, through esophageal opening in diaphragm to posterior surface of stomach. The *left* passes between the subclavian and carotid arteries, in front of arch of aorta to root of lung, along anterior surface of esophagus, through diaphragm, to anterior surface of stomach. *Distribution* is shown by the names of the branches: Menin-

geal, auricular, pharyngeal, superior and inferior laryngeal, cardiac, pulmonary esophageal, and gastric.

6. *Ductless glands:* (1) The *spleen;* situated in the back part of the left hypochrondriac and epigastric regions, being covered by the ninth, tenth, and eleventh ribs on the left side. (2) The *thyroid;* situated on the sides and in front of the upper part of the trachea, and extending upwards on each side of the larynx. (3) The *suprarenals;* situated in the back part of the abdominal cavity, behind the peritoneum, one on the upper extremity of each kidney, and slightly also on the inner and anterior surfaces. (4) The *carotid gland;* situated generally in the carotid bifurcation. (5) The *thymus;* situated in neck, and superior mediastinum, up to lower border of thyroid. (6) The *coccygeal gland,* at the tip of the coccyx.

7. *Relations of the right kidney. In front:* Right lobe of liver, 2d part of duodenum, hepatic flexure of colon (of which the last two areas are nonperitoneal). *Behind:* Diaphragm, quadratus lumborum, psoas, fasciæ covering these muscles, anterior lamella of lumbar aponeurosis, iliohypogastric, ilio-inguinal, nerves, last dorsal; 1st lumbar artery, pleura, last intercostal space and 12th rib.

Relations of the left kidney. In front: Fundus of stomach, postero-internal surface of spleen, tail of pancreas, descending colon (of which last two are nonperitoneal. *Behind:* As on right, except that left kidney, lying rather higher, lies over 11th rib.

Above each kidney is the suprarenal body.

Below each kidney is the iliac crest.—(*Aids to Anatomy.*)

Nerve supply: From renal plexus.

8. The lower lobe of the left lung is below and behind the deep fissure which divides the lung into upper and lower lobes. It is larger than the upper lobe, and includes most of the base of the lung and the posterior border.

9. *The ligaments of the uterus* are: Two round ligaments, two broad ligaments, anterior or vesicouterine ligament, posterior or rectouterine ligament, two sacrouterine ligaments.

10. The *common bile-duct* is the result of the union of the hepatic and cystic ducts. It passes behind the first part of the duodenum, in front of the vena portæ, with the hepatic artery on the left, between the layers of the gastrohepatic omentum, and, passing between the pancreas and second part of the duodenum, enters the small intestine obliquely, a little below the middle of the descending part of the duodenum by an opening common to it and the pancreatic duct.—(From *Aids to Anatomy.*)

HISTOLOGY.

1. (1) Red corpuscles, about 5,000,000 to the cubic milli-

meter. (2) White corpuscles, about 7,000 to 10,000 per cubic millimeter; (of these there are: small mononuclears, about 20 per cent.; large mononuclears, about 8 per cent.; polynuclears, about 70 per cent.; and eosinophiles, about 2 per cent.). (3) Platelets, about 400,000 to the cubic millimeter.

2. A cross-section of a bone shows *Haversian canals:* around these the bone is arranged in rings or *lamellæ:* between these are spaces (*lacunæ*) in which are *bone corpuscles.* Each canal is connected with the lacunæ which are concentric with it, and the lacunæ with one another by means of fine canals (*canaliculi*) into which project processes of the bone corpuscles. A Haversian canal with its lamellæ, lacunæ, bone corpuscles, and canaliculi form a *Haversian system.* In a section of bone several of these systems may be seen, the spaces between them being occupied by *interstitial lamellæ.* Lamellæ which are on the surface of the bone, parallel with its circumference, are *circumferential lamellæ.* A longitudinal section of bone shows the Haversian canals to be what their name indicates, channels running through the bone. Their communications with one another are also seen. In each canal are an artery and a vein. If a piece of bone is treated with dilute nitric acid, so as to dissolve the lime salts which it contains, or by some other method of *decalcification,* a small portion may be torn off, which upon examination shows the fibrous structure of the lamellæ. Such specimens also show the *perforating fibers of Sharpey,* which hold the lamellæ together; elastic fibers may also be observed.—(Raymond's *Physiology.*)

3. *Composition of bone* is thus given by Cunningham:

Organic matter (Fat, Collagen)		31.04
Mineral matter:		
Calcic phosphate	58.23	
Calcic carbonate	7.32	
Calcic fluoride	1.41	68.97
Magnesic phosphate	1.32	
Sodic chloride	.69	
		100.00

4. *Cartilage* is a material which is a transition stage of connective tissue into bone. When boiled it yields chondrin. It is not vascular, and is found in adult life chiefly in the joints, in the parietes of the thorax, and in various tubes which are to be kept permanently open.

Hyaline cartilage is composed of round or oval cells and intercellular substance. It is found in embryos in regions where bone is to be formed, also in the nose, larynx, trachea, bronchi, and in symphyses, epiphyses and synchon-

droses; costal cartilage and epiphyseal cartilage are composed of it.

White cartilage, also called *fibro-cartilage,* is composed of white fibrous tissue and cartilage in varying proportions. It is found at the insertion of the ligamentum teres into the head of the femur, in the intervertebral discs, in the symphysis pubis, and interarticular cartilages.

Interarticular cartilage is found in the temporo-mandibular sterno-clavicular, acromio-clavicular, wrist and knee joints.

Connecting cartilages are found between the bodies of the vertebræ and between the pubic bones.

Circumferential cartilage surrounds the margin of some articular cavities, as cotyloid and glenoid cavities.

Stratiform cartilage forms a thin coating to bony grooves through which muscle tendons glide; also found in tendon of Peroneus longus and of Tibialis posticus.

Reticular cartilage is probably elastic cartilage, found in the epiglottis, external ear, Eustachian tube, and cartilages of larynx.—(From Gray's *Anatomy.*)

5. *Voluntary* muscle is striated, has long narrow fibers with cross striations and many nuclei beneath the sarcolemma. *Involuntary* muscle is non-striated, has spindle-shaped fibers, one nucleus centrally located, and no sarcolemma. The great exception is cardiac muscle, which is involuntary and also striated. *Voluntary muscle* is found in all the skeletal muscles, pharynx, diaphragm, larynx, external ear, and eye. *Involuntary muscle* is found in the alimentary tract from the middle third of the esophagus to the anus, in the ducts of glands, in the trachea and bronchial tubes, within the eyeball, the internal urinary and genital systems, circulatory (except the heart) and lymphatic systems, and the capsules of some organs.

6. *Purkinjè's cells* are found in the cortex of the cerebellum. *White substance of Schwann* is found surrounding the axis cylinder of medullated nerve fibers. *Neurilemma surrounds* the medullary sheath of cerebrospinal nerves and the axis cylinder of sympathetic nerves.

7. *Cerebrospinal nerve fibers* are medullated; and consist of an axis cylinder, a medullary sheath, and a neurilemma. *Sympathetic nerve fibers* are mostly non-medullated; and consist of an axis cylinder and a neurilemma, but have no medullary sheath.

8. *Layers of skin, from without inward:* Stratum corneum, stratum lucidum, stratum granulosum, Malpighian layer, papillary layer, and reticular layer.

9. *Coats of arteries, from within outward:* Tunica intima (with endothelium), subendotheliel layer, and Henle's fenestrated membrane); tunica media (with muscle fibers, elastic fibers, connective tissue), and tunica adventitia

(with connective tissue fibers and cells, elastic tissue, vasa vasorum, and nerves).

PHYSIOLOGY.

1. The principal nerve upon which voice depends is the tenth cranial nerve or pneumogastric; it is a mixed nerve.

2. "There are three important organs of the body—namely, the heart, the lungs, and the brain—in which the existence of a vasomotor supply is still a matter of uncertainty."—(Howell.)

3. *The function of the gall-bladder* is: (1) To store up the bile between the time of its secretion and its passage into the duodenum; (2) to eject the bile into the duodenum. Although the bile is formed more or less continuously, it enters the duodenum periodically during the process of digestion.

4. *The principal factors controlling the flow of lymph* are: (1) Intracapillary pressure, which tends to filter the plasma through the endothelial cells composing the walls of the capillaries; (2) the force of diffusion, depending upon the inequality in chemical composition of the blood plasma and the liquid outside the capillaries, or, on the other side, between this liquid and the contents of the tissue elements; (3) the force of osmotic pressure; (4) variation in the permeability of the capillary wall.—(Howell.)

The lymphatic circulation differs from the circulation of the blood in that it (the lymphatic circulation) is only in one direction, namely, toward the heart.

5. *Four principal ways in which heat is lost from the body:*

(1) By urine and feces, 1.8 per cent.
(2) By expired air, 8.7 per cent.
(3) By evaporation from skin, 14.5 per cent.
(4) By radiation and conduction from skin, 73.0 per cent.

6. A *carbohydrate* is an organic substance, formerly of unknown constitution and containing in its molecule 6, or some multiple of 6, atoms of carbon, and hydrogen and oxygen in the proportions to form water.

Four functions of carbohydrate foods: (1) As a source of energy; (2) source of heat; (3) to save tissue waste; (4) to spare or aid the proteids.

7. NORMAL URINE. *Specific gravity:* About 1015 to 1025. *Chemical reaction:* Acid. *Average daily quantity:* About 40 to 50 ounces. *Constituents:* Water; urea, uric acid, hippuric acid, xanthin, hypoxanthin, creatin, creatinin; sulphates, chlorides, and phosphates (of sodium, potassium, etc.), and pigments.

8. The *chief source* of urea is the nitrogenous intake

(proteids) of the food; *average daily quantity excreted* is about 500 grains; it is *chiefly formed* in the liver.

9. *Effect of breathing condensed air:* Muscular and articular pains, paralysis, dyspnea, and congestion.

Effect of breathing rarefied air: Headache, vertigo, nausea, weakness.

Symptoms of increased percentage of oxygen: Inflammation of lungs, convulsions, and death.

Symptoms of decreased percentage of oxygen: Dyspnea, convulsions, and anoxemia.

10. GASTRIC JUICE. *Specific gravity,* about 1002 or 1003. *Chemical reaction,* acid. *Principal ensymes:* (1) Pepsin, which converts proteids into proteoses and peptones; and (2) Rennet, or Chymosin, which curdles milk.

CHEMISTRY.

1. An element is said to be in the *nascent state* at the moment that it is set free from one of its compounds.

2. "*Catalysis* is chemical decomposition induced by the presence of a body which either takes no part in the reaction or is restored to its original state at the end of the process."—(Stedman.)

3. The name "*ion*" was first applied by Faraday to the primary products of electrolysis; those which separate at the positive electrode, or anode, are called *anions,* while those which separate at the negative electrode, or cathode, are called *cations.* Thus potassium sulphate yields the cation K and the anion SO_4. Hydrogens, the metals, and basic radicals are cations; hydroxyl and the acid residues are anions. *Ionization,* or dissociation into ions, occurs when an electrolyte is dissolved. A solution of potassium chloride contains not only the molecule KCl but also the cation K and the anion Cl, and the action of the current is to separate these (already liberated) ions at the respective electrodes.—(Witthaus' *Essentials.*)

4. *Test for free hydrochloric acid in gastric contents:* Gunzburg's reagent (phloroglucin 2 grams; vanillin, 1 gram; dissolved in 100 c.c. of alcohol), freshly prepared, and a few drops of filtered gastric contents (equal parts of each) are mixed in a porcelain dish, and then evaporated in a water bath; in the presence of free mineral acids a bright scarlet is produced, beginning at the upper border.

5. *Gmelin's test for bile pigment:* Put 3 c.c. HNO_3 in a test tube, add a piece of wood, and heat until the acid is yellow; cool. When cold, float some of the urine to be tested upon the surface of the acid. A green band is formed at the junction of the liquids, which gradually rises, and is succeeded from below by blue, reddish-violet, and yellow.

6. *Test for albumin:* "The urine must be perfectly clear. If not so, it is to be filtered, and, if this does not render it transparent, it is to be treated with a few drops of magnesia mixture and again filtered.

"The reaction is then observed. If it be acid, the urine is simply heated to near the boiling point. If the urine be neutral or alkaline it is rendered *faintly* acid by the addition of dilute acetic acid, and heated. If albumin be present a coagulum is formed, varying in quantity from a faint cloudiness to entire solidification, according to the quantity of albumin present. The coagulum is not redissolved upon the addition of nitric acid."

Test for sugar: First remove any albumin that may be present, then "render the liquid strongly alkaline by addition of sodium carbonate. Divide about 6 c.c. of the alkaline liquid in two test-tubes. To one test-tube add a very minute quantity of powdered subnitrate of bismuth, to the other as much powdered litharge. Boil the contents of both tubes. The presence of glucose is indicated by a dark or black color of the bismuth powder, the litharge retaining its natural color."

Test for indican in the urine: The urine is mixed with one-fifth its volume of 20 per cent. solution of lead acetate and filtered. The filtrate is mixed with an equal volume of fuming hydrochloric acid containing 3:1,000 of ferric chloride, a few drops of chloroform are added, and the mixture strongly shaken one to two minutes. With normal urine the chloroform remains colorless, or almost so; but if an excess of indoxyl compounds be present the chloroform is colored blue, and the depth of the color is a rough indication of the degree of the excess.—(From Witthaus' *Essentials of Chemistry.*)

7. POISONING BY IODINE. *Symptoms:* Pain in esophagus and stomach, vomiting, diarrhea, severe abdominal pain, mouth pale and dry, odor of iodine on breath, quickened respiration, weak and rapid pulse. *Treatment:* Wash out the stomach with water containing albumin and starch paste or sodium thiosulphate in solution. *Death* has followed ingestion of one dram by an adult and of 20 grains by a child of four years. *Test:* The urine of the patient if agitated with carbon disulphide becomes colored violet by iodine (but not by the iodides).

8. CYANIDE OF POTASSIUM. *Fatal dose:* Death has followed the ingestion of 2 or 3 grains, and persons have recovered after swallowing 30 or 40 grains. *Symptoms of poisoning:* Lips and mouth corroded, burning pain in throat and stomach, vertigo and insensibility, face pale and bloated, convulsions of a tetanic character, quick pulse, slow and stertorous respirations, loss of consciousness. *Test:* Moisten a filter paper with freshly prepared tincture

of guaiac, dip this paper into very dilute solution of copper sulphate, and after drying moisten it with a solution containing the suspected substance; a deep blue color results if a cyanide is present.

9. *To detect the presence of salicylic acid:* "It is best detected in solution, and solids and semi-solids should be macerated in water and then strained through a white cotton cloth. Two or three ounces of the fluid to be tested is used, adding to it a few drops of sulphuric acid. Shake thoroughly and filter. To the clear liquid add three or four tablespoonfuls of chloroform, mix by a rotary motion, but do not shake, or an emulsion will be formed which is difficult to break up. Allow the chloroform to settle and remove as much as possible by means of a pipette. This is placed in a test tube with an equal amount of water and a small piece (a little larger than a pin's head) of iron alum. Shake well and allow to settle, and if salicylic acid is present the upper layer will have a purple color."—(Friedenwald and Ruhrah.)

10. *Symptoms of acetanilid poisoning:* Chilliness, cold sweat; nausea; pulse is soft, slow, and feeble; respirations slow and shallow. *Treatment:* Lavage, diffusible stimulants, application of heat, coffee or strychnine, inhalation of oxygen, or saline infusion. *Test:* "The most convenient method is to test for the presence of the drug in the urine. For this purpose the urine is concentrated and boiled for three minutes with about one-tenth of its volume of hydrochloric acid. After cooling it is shaken up with an equal volume of ether, the ether separated and evaporated, the residue dissolved in water, and a few drops of a 5 per cent. solution of phenol added. Some solution of chlorinated lime is now added, and if para-amido-phenol (acetanilid) is present the solution becomes red, and on adding ammonium hydroxide it is changed to blue."—(Riley.)

BACTERIOLOGY.

1. The organism that causes gonorrhea is the gonococcus of Neisser.

2. Diphtheria is caused by the Klebs-Loeffler bacillus.

3. *Antitoxin* is a substance formed in the body, of a protective character, and capable of rendering inert the poisonous products of bacteria.

Diphtheria antitoxin is obtained from the horse, the animal having been rendered artificially immune by repeated injections extending over a period of several months of gradually increasing quantities of the strongest diphtheria toxin. As the bacilli themselves are not injected, the horse does not become infected with diphtheria, but he gradually acquires a tolerance for the toxins of the

disease and develops in his blood a substance (antitoxin) which has the power to neutralize those toxins. At the proper time, when it is thought that his blood has acquired the requisite degree of potency, the animal is bled, and the serum—the part of the blood containing the antitoxin—is carefully separated from the clot, filtered, and standardized. The last procedure is accomplished by determining the quantity of antitoxin serum required to offset the effects of the minimum quantity of toxin necessary to kill a guinea-pig in a definite time. The strength of the antitoxin is measured in units, a unit containing the amount of antitoxin required to save the life of a guinea-pig which has been injected with 100 fatal doses of toxin."—(Stevens' *Materia Medica.*)

4. To demonstrate the existence of *tubercle bacilli* in the sputum: The sputum must be recent, free from particles of food or other foreign matter; select a cheesy-looking nodule and smear it on a slide, making the smear as thin as possible. Then cover it with some carbolfuchsin, and let it steam over a small flame for about two minutes, care being taken thtat it does not boil. Wash it thoroughly in water and then decolorize by immersing it in a solution of any dilute mineral acid for about a minute. Then make a contrast stain with solution of Loeffler's methylene blue for about a minute; wash it again and examine with oil immersion lens. The tubercle bacilli will appear as thin red rods, while all other bacteria will appear blue.

5. *The most important pus producing bacteria* are: *Staphylococcus pyogenes aureus, Staphylococcus pyogenes albus, Staphylococcus pyogenes citreus, Streptococcus pyogenes;* also sometimes the pneumococcus, gonococcus, *B. coli communis, B. pyocyaneus, B. typhosus,* and *B. epidermidis albus.*

6. Amebic dysentery is caused by the *Amœba coli.*

7. Tetanus is caused by the *Bacillus tetani.*

It is necessary to open up punctured wounds immediately after the injury, on account of the possible presence of the *Bacillus tetani.* This is anerobic, and comes from the soil, and cannot develop in the presence of oxygen.

8. The *Streptococcus erysipelatis* is considered to be the cause of erysipelas.

9. For the growth and cultivation of the disease-producing bacteria there is required a temperature approximating that of the human body.

10. Influenza is supposed to be caused by the *Bacillus influenzæ.*

PHYSICAL DIAGNOSIS.

1. *Physical signs of lobar pneumonia: "Inspection* reveals during the first stage deficient movement of the

affected side, due to pain. The apex-beat is normal in situation, and the interspaces do not bulge. In the second stage the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air, the diphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiration).

Palpation during the first stage shows the vocal fremitus to be more distinct than normal, especially over the diseased portions. In the second stage, the vocal fremitus is markedly exaggerated, except in rare instances of occlusion of the bronchi by secretion. The cardiac impulse is felt in the normal position.

Percussion.—In the first stage, the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage, there is dullness over the affected parts, with an increased sense of resistance. Over unaffected adjoining areas, the resonance is increased (Skoda's resonance).

Auscultation.—In the first stage there is heard over the affected part a feeble, vesicular murmur, associated with the true vesicular or crepitant (crackling) râle, heard at the end of inspiration only. In the second stage there is harsh, high-pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion. Bronchophony, or distinctly transmitted voice, is present and at times pectoriloquy, or distinct transmission of articulated sounds, may be heard. In the third stage the breathing changes from bronchial to bronchovesicular and the crepitant râle (crepitatio redux) returns. As resolution proceeds, the breath sounds are associated with large and small moist and bubbling rales."—(Hughes' *Practice of Medicine.*)

2. *Chronic interstitial pneumonia: Inspection* reveals marked retraction of the affected side, due to shrinking of the diseased lung. *Percussion* yields a dull note or impaired resonance, with scattered areas, over which hyperresonance or tympany may be obtained. *Auscultation* in the early stage serves to elicit vesiculobronchial or harsh respiration, associated with large and small moist or bubbling râles, but at a later period bronchial, bronchocavernous, and cavernous breathing, with circumscribed gurgling râles, may be heard.

3. Cough, failing health, emphysema, profuse and mucopurulent expectoration.

4. CARDIAC HYPERTROPHY: "*Inspection* reveals fullness or prominence of the precordium with a distinct impulse. *Palpation* detects the impulse one or two intercostal spaces

lower down and to the left. It is stronger and more or less diffused—the heaving impulse. *Percussion* determines an increase in the area of cardiac dullness vertically and transversely on the left side of the sternum, unless the right ventricle is also hypertrophied, when the cardiac dullness is increased to the right of the sternum. *Auscultation* in simple hypertrophy without any valvular changes detects a loud first sound of a somewhat metallic quality, the second sound being strongly accentuated. In the presence of valvular disease the characteristic murmurs are heard in addition."—(Hughes' *Practice of Medicine.*)

5. CARDIAC DILATATION: "*Inspection* detects enlargement and distention of the superficial veins and an indistinct, often wavy and diffused, cardiac impulse. If tricuspid regurgitation is present jugular pulsation will be observed. *Palpation* confirms inspection; the impulse is feeble, irregular, and heaving. *Percussion* serves to determine extension of the area of cardiac dullness transversely and especially toward the right side. *Auscultation* in the presence of valvular lesions reveals characteristic murmurs. If there are no valvular lesions the cardiac sounds are weaker than normal and the first sound is sharper in quality than usual."—(Hughes' *Practice of Medicine.*)

6. *Pleurisy:* During the first stage, expansion and tactile fremitus are diminished over the affected area and a to-and-fro crackling friction sound, which is not removed by coughing, is heard. When the effusion has developed, there will be immobility of the affected side, with bulging of the interspaces and displacement of the apex beat to the opposite side. Dullness, which is movable, may be elicited by percussion. The line of the dullness is curved, being higher posteriorly. Above the effusion, a hyperresonant note (Skoda's resonance) may be obtained. Bronchial breathing may be heard early in the affection, but later the breath sounds are weak and sometimes inaudible. Vocal resonance is usually diminished or absent, but sometimes bronchophony may be heard. There is also an increase in the anteroposterior diameter of the affected side. Tactile fremitus is diminished and resonance is impaired. Auscultation detects friction sounds, diminished vocal resonance, and diminution in the intensity of the respiratory murmur.—(*Pocket Cyclopedia.*)

7. *Aortic regurgitation.*—Forcible apex beat displaced downward and outward. Area of cardiac dullness increased to left. Diastolic murmur heard at base, and transmitted down sternum. Corrigan pulse is also present.

8. *Plastic pericarditis* may give a fremitus or palpation; on auscultation there is a superficial to-and-fro friction sound, not transmitted.

9.

Pericarditis with Effusion.	Cardiac Dilatation.
1. Inspection often reveals bulging (more marked in the young). Apex-beat is elevated, feeble, and later absent.	1. Apex-beat usually visible, wavy, and diffuse.
2. Heart's impulse usually absent, or occupies center or upper border of dull area. Friction fremitus may be present.	2. Though feeble, the impulse is palpable.
3. Percussion shows a triangular flat area, and the boundary line above changes on altering the position of the patient. There is dull tympany (flatness in massive exudations) in the axillary region. Dullness over left lung below angle of scapula common.	3. Dull area varies with the chambers dilated; it is coexistent with a wavy impulse, does not extend so high (except in mitral stenosis), and does not vary with change of position. There is no dull tympany.
4. Auscultation shows the first sound distant and muffled; a friction-rub is often present.	4. First sound clear, short, and sharp, resembling the second sound (fetal heart). Friction murmur rare, but an endocardial murmur may appear later.

(Anders and Boston.)

10. "***Amphoric respiration*** is a blowing respiration having a musical or metallic quality. It is a variety of bronchial respiration produced in a large cavity with firm walls, permitting the reflection of the sound. An imitation of this sound, though only an imperfect one, is produced by blowing over the mouth of an empty bottle. The amphoric character is present with both the acts of inspiration and expiration. Amphoric or metallic respiration is indicative of a large cavity, not common in phthisis, but more often heard at the upper part of a lung compressed by fluid air, as in pneumo-hydrothorax."—(Hughes' *Practice of Medicine.*)

PATHOLOGY.

1. *Degenerations* are: Parenchymatous, fatty, amyloid, hyaline, colloid, mucoid.

2. Sclerosis, hypertrophy, dilatation, incompetency.

3. ***Endarteritis*** is inflammation of the inner coat of an artery.

The danger to the tissues in endarteritis obliterans is in the interference with the nutrition and subsequent degenerative changes.

4. The white cells increase very much, myleocytes may be present, the lymphatic glands enlarge greatly.

5. In *fatty degeneration* the cell protoplasm is converted into fat; in *fatty infiltration* there is a deposit of fat within the cell, or in the intercellular tissues.

6. Two pathological conditions resulting from altered secretion of the thyroid gland: Myxedema, and exophthalmic goiter.

7. *Union of a wound by first intention* means the immediate healing of a wound without suppuration and without the formation of granulations.

8. *Common malignant tumors of the breast:* Carcinoma, sarcoma, and epithelioma.

9. A *thrombus* is a clot in the blood-vessels during life. An *embolus* is an intravascular obstruction from the lodgment of a foreign body.

10. *Pathology of typhoid fever.*—"Principally inflammation of the lymphoid tissue of the lower portion of the ileum, with more or less catarrh throughout the bowels. Peyer's Patches—1st week.—Are swollen through infiltration of leucocytes, the surfaces raised and fawn-colored—the infiltration involves the submucous coat. The lesions are most numerous at the lower end of the ileum. 2nd week.—The surface becomes abraded; sloughs form, which are often bile-stained. 3rd week.—Sloughs come away, leaving ulcerating surfaces. Typical typhoid ulcers are thus formed. A few solitary glands undergo the same process. At the end of the week the ulcers begin to granulate, but healing is usually slow.

"Mesenteric glands may undergo the same changes, but more often become swollen, red, and tender only, or break down into cheesy masses. Other organs—Spleen and liver are enlarged; heart is soft and flabby. The voluntary muscles undergo granular degeneration; in fact, similar changes to those found after death from high temperature." —(Wheeler and Jack.)

OBSTETRICS.

1. *Positive signs of pregnancy:* (1) Hearing the fetal heart sound; (2) active movement of the fetus; (3) ballottement; (4) outlining the fetus in whole or part by palpation; and (5) the umbilical or funic souffle.

Doubtful signs of pregnancy: (1) Progressive enlargement of the uterus; (2) Hegar's sign; (3) Braxton Hick's sign; (4) uterine murmur; (5) cessation of menstruation; (6) changes in the breasts; (7) discoloration of the vagina and cervix; (8) pigmentation and striæ; (9) morning sickness.

Subjective signs of pregnancy, in the order of their appearance, are: Cessation of menstruation, morning sickness, increased frequency of urination, active fetal movements.

Objective signs of pregnancy, in the order of their appearance, are: Softening of the cervix, changes in the mammary glands, discoloration of the vulva and vagina, pulsation in the vaginal vault, Hegar's sign, active fetal movements, ballottement, palpation of the fetus, intermittent uterine contractions, hearing the fetal heartbeat, rate of growth of the uterine tumor.

2. *Signs of approaching labor:* Dilatation of the os, characteristic recurrent pains, and the escape of blood-stained mucus from the cervix ("the show").

3. All infectious diseases. She should be kept isolated from such diseases, and strict asepsis and antisepsis should be observed around her.

4. "*The patient* should receive a full bath before labor begins and all bed-clothing and personal clothing should be clean. If there is any pathologic discharges from the genitalia, the vagina should be thoroughly scrubbed with tincture of green soap and hot water, followed by a mercuric chloride douche (1:2000); this followed by a douche of sterile water. The physician's hands should be scrubbed for 10 minutes with tincture of green soap and hot water, followed by alcohol, and immersion in mercuric chloride (1:1000). All instruments should be boiled for 10 minutes or immersed in mercuric chloride (1:1000) for half an hour. Examinations should be made to determine the position, presentation, size of the fetus, etc.

During the first stage a rectal enema of soapsuds with turpentine (3i) should be given, and when the os is dilated to the size of a silver dollar, the patient should be placed in bed, lying upon the side toward which the fetal back looks. If the pain is severe, chloral hydrate (gr. 15) may be given every half-hour for 3 doses.

During the second stage, examinations should be made when necessary. In multiparæ, the membranes may be ruptured with the finger or with some aseptic instrument. Care should be taken not to injure the child's scalp or the lower uterine segment. The pain may require the administration of chloroform or ether, but not to the extent of complete anesthesia. The expulsive force of the abdominal walls may be increased by directing the patient to pull upon a sheet firmly secured to the foot of the bed. Attempts may be made to prevent laceration of the perineum by making firm backward and upward pressure against the occiput during the pains; by restraining voluntary expulsive efforts during the pains; and by securing expulsion of the head between the pains. The head should

be supported when born; the eyes should be cleansed with sterile water; and if the cord is coiled about the neck, it should be loosened or slipped over the head. Delay in delivery of the shoulders may be overcome by stimulating the uterus by friction through the abdominal wall or traction. The cord is ligated and cut when pulsation has ceased, and the child is placed by the mother's side with its face turned away from the maternal discharges.

During the third stage, 3i of fluid extract of ergot is administered and irritation of the uterus by frction through the abdominal wall is practised for 10 to 15 minutes. If the placenta is not expelled by this time, the uterus is firmly grasped between the thumb and 4 fingers and compressed. Firm pressure is then made from above downward and backward in the direction of the pelvic canal. This usually causes delivery of the placenta. A vulvar pad of salicylated cotton and carbolized gauze and an abdominal pad and binder are then applied."—(Gould and Pyle's *Pocket Cyclopedia.*)

5. *Placenta prævia* is the condition in which the placenta is attached in the lower uterine segment, and may be near or over (partially or completely) the internal os. *Symptoms:* Sudden hemorrhage, accompanied by syncope, vertigo, restlessness, and feeble pulse. *Treatment:* Stop the hemorrhage by a vaginal tampon; this must be tight and thorough. *Accouchment forcé* is indicated; this consists of dilatation of cervix, version, and immediate extraction of the child.

6. Version should be attempted; cranfotomy may be necessary.

7. Care should be taken to prevent locking of the two heads. If this happens, it may be necessary to sacrifice one of the children.

8. *Puerperal eclampsia* is an acute morbid condition, occurring during pregnancy, labor, or the puerperal state, and is characterized by tonic and clonic convulsions, which affect first the voluntary and then the involuntary muscles; there is total loss of consciousness, which tends either to coma or to sleep, and the condition may terminate in recovery or death. *Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:* (1) Controlling the convulsions (by chloroform, veratrum,

or chloral); (2) elimination of the poison or poisons which are presumed to cause the convulsions; (3) emptying the uterus under deep anesthetics, by some method that is rapid and that will cause as little injury to the woman as possible.

9. "After the cord has been ligated and cut, the eyes should be cleansed with a saturated solution of boric acid, after which, if there is any vaginal discharge from the mother, 1 or 2 drops of a 1 per cent. solution of silver nitrate should be instilled in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100 F., carefully dried, and the cord dusted with some antiseptic powder. Sponging should be practised for 10 days, after which a full tub-bath at 98 F. should be given daily for 6 months. The temperature may then be reduced to 95 F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel and dusting-powders should be used to prevent chafing. An infant may be taken out of doors in summer when 1 week old, and in winter on pleasant days at 3 months of age. The new-born infant should sleep about 22 hours out of a possible 24, gradually diminishing this until at 2 years the child should sleep at least 12 hours of the day, and at 3 years not less than 11. The sleeping-room should be well ventilated."—(Gould and Pyle's *Pocket Cyclopedia.*)

10. "As soon as the diagnosis is established with reasonable certainty, the removal of the gestation sac is the only treatment worthy of consideration."—(Hirst.)

GYNECOLOGY.

1. ***Ectopic gestation*** **is gestation occurring elsewhere than in the cavity of the uterus.**

"When extrauterine pregnancy exists there are: (1) The general and reflex symptoms of pregnancy; they have often come on after an uncertain period of sterility. Nausea and vomiting appear aggravated. (2) Then comes a disordered menstruation, especially metrorrhagia, accompanied with gushes of blood, and with pelvic pain coincident with the above symptoms of pregnancy. Pains are often very severe, with marked tenderness within the pelvis. Such symptoms are highly suggestive. (3) There is the presence of a pelvic tumor characterized as a tense cyst, sensitive to the touch, actively pulsating. This tumor has a steady and progressive growth. In the first two months it has the size of a pigeon's egg; in the third month it has the size of a hen's egg; in the fourth month it has the size of two fists. (4) The os uteri is patulous; the uterus is

displaced, but is slightly enlarged and empty. (5) Symptoms No. 2 may be absent until the end of the third month, when suddenly they become severe, with spasmodic pains, followed by the general symptoms of collapse. (6) Expulsion of the decidua, in part or whole. Nos. 1 and 2 are *presumptive signs;* Nos. 3 and 4 are *probable signs;* Nos. 5 and 6 are *positive signs.*" (*American Text-Book of Obstetrics.*)

2. See OBSTETRICS, Question 10.—The steps of the operation are thus given by Dorland: (*a*) The observance of absolute antisepsis; (*b*) a median abdominal incision; (*c*) the evacuation of clots and free blood that will be contained within the abdominal and pelvic cavities subsequent to rupture; (*d*) the separation of any adhesions that may exist; (*e*) the ligation and extirpation of the affected tube; (*f*) irrigation of the peritoneal cavity with hot water; (*g*) closure of the abdominal incision; the subsequent treatment the same as in an uncomplicated ovariotomy.

3. *Three types of endometritis:* Simple, gonorrheal, and septic.

Tuberculous endometritis might be suspected in patients who had a tuberculous lesion elsewhere. The diagnosis might be confirmed by finding the tubercle bacilli in the endometrium.

4. *Uterine hemorrhage after the menopause* is of grave import; it may denote malignant tumor of the uterus (or cervix), or inflammation of the uterus or appendages.

5. *Three of the earliest symptoms of cancer of the cervix uteri:* Bleeding, offensive vaginal discharge, and pain.

Three conditions with which it might be confused: Cervical fibroid, adenoma of the cervix, and hypertrophy of the cervix.

6. *Three clinical symptoms of retroversion of the uterus:* Pain (dysmenorrhea), metrorrhagia, and leucorrhea. Treatment consists in replacing the uterus and then retaining it in position. The cause must be removed; pessaries, the sound, and tampons may be employed; adhesions must be broken up; lacerated perineum must be repaired; hysteropexy or shortening of the round ligaments may be considered.

7. *Five diagnostic symptoms of carcinoma of the breast:* Lymphatic involvement, edema of the arm, slow growth, cachexia, and ulcer with foul discharge.

8. All tears of the perineum should be repaired as soon as possible (unless there are contraindications). A primary operation is best because the edges are fresh and can be approximated; little (if any more) anesthetic is wanted; the woman has to lie in bed, and therefore only one absence from household work is requisite; infection is less likely. In any case, operation may prevent rectocele, cys-

tocele, prolapse of uterus, and general weakness, malaise, and disability.

9. DYSMENORRHEA. *Symptoms:* Pain during or in the neighborhood of the menstrual period, varying from malaise to agony; it is chiefly noticed just before or at the beginning of the period. There may also be evidences of tumor, inflammation, obstruction, malposition, or malformation of the uterus. *Four types:* Obstructive, ovarian, membranous, and congestive.

10. In *pyosalpinx* there is generally some fever; the mass is elastic, and may fluctuate and is sensitive to pressure; there are often adhesions, and there is a history of infection. In *tubal pregnancy* the mass is apt to be firm and not sensitive to pressure; there are not adhesions; and there is a history of pregnancy with corresponding symptoms and signs. In the *appendiceal abscess* the infection is more often due to colon or tubercle bacillus than to gonococcus; tenderness is in region of McBurney's point; the mass is not generally felt by vaginal touch.

SURGERY.

1. Apply a Buck's extension with enough weight to overcome the shortening. Lateral displacement is corrected by saindbags or lateral splints. If there is a marked tendency to displacement of the lower fragment backwards, a double inclined plane must be used.

2. In dislocation the acetabulum is empty, the head of the bone in an abnormal position; there is no crepitus, no free movement; in *fracture* the opposite is the case. In *dislocation,* the leg is flexed, adducted, and inverted. In *fracture,* it is rotated outward.

Treatment of dislocation: The patient is placed on a mattress on the floor and anesthetized. The leg and the thigh are flexed in the position of adduction. This rolls the head down to the lower part of the acetabulum. The leg is then circumducted outwards and brought down straight; this carries the head through the rent into the acetabulum. Failing success by this method, the body must be fixed and direct upward traction must be exercised upon the flexed thigh. As a rule these manœuvres are successful; if not, extension by pulleys must be made use of.

Treatment of fracture: The patient should be anesthetized, and traction kept upon the leg during fixation. A stirrup extension is first put on, and then the leg is firmly bandaged to a long Liston splint, with the eversion corrected. The chest is fixed to the splint by a binder; the foot of the bed is raised, and a weight of 8 or 10 pounds is put on to the cord of the stirrup extension. Hodgen's splint may also be used. Union occurs in six weeks.

3. GASTRO-ENTEROSTOMY. *Indications:* Cancer of pylorus,

stenosis of pylorus, ulcer of stomach. Gastro-enterostomy "is done either by direct stitching, or by the use of Murphy's button, or of one of the various bone bobbins. The upper part of the jejunum is united to either the anterior or posterior surface of the stomach. The anterior operation is quicker, easier, and there is less risk of soiling the peritoneum; but it has the disadvantage that it may cause pressure on the transverse colon, over which it is dragged. In the posterior operation the upper part of the jejunum is selected, an opening is made through the transverse mesocolon, and the jejunum is stitched to the posterior wall of the stomach. The stomach should be previously washed out with boric acid lotion. A double row of continuous stitches should be used, the inner going through all the coats of the intestine and stomach, the outer through peritoneum and muscular coats only. The opening should be at least 1½ inches long. Rectal feeding should be adopted for two days; then peptonized milk may be given cautiously by the mouth, and in a week other milk foods. Murphy's button saves time if the patient is very weak."—(Aids to Surgery.)

4. Drainage of the gall-bladder is advised after operations on the gall-bladder (other than excision of the gall-bladder). *Cholecystectomy*, according to Robson, may be required in (1) wounds of the gall-bladder in which suture is impracticable; (2) stricture of the cystic duct; (3) phlegmonous cholecystitis and gangrene of the gall-bladder; (4) multiple or perforating ulcers; (5) chronic cholecystitis in which the gall-bladder is too small to safely drain, or in which it is enlarged, thickened, and ulcerated, the common duct being free from obstruction; (6) mucous fistula due to stricture of the cystic duct; (7) hydrops due to stricture of the cystic duct; (8) certain cases of empyema in which the walls of the gall-bladder are seriously damaged; (9) cancer limited to the gall-bladder or to the immediately adjoining parts; (10) certain other solid tumors of the gall-bladder, whether inflammatory or neoplastic, and (11) in calcareous gall-bladder. It is contraindicated when there is obstruction of the common duct. The cystic duct and artery are surrounded by a ligature, the duct grasped with hemostatic forceps between the ligature and the gall-bladder, and severed betwen the forceps and the ligature, and the gall-bladder removed from within outwards by blunt dissection. Any oozing from the liver is controlled by sutures or gauze packing. If bleeding is controlled absolutely, drainage may be omitted. If drainage of the biliary apparatus is required, the cystic artery alone should be ligated, and a rubber tube sutured to the end of the open cystic duct with catgut. When cholecystectomy is indicated but is impracticable, e.g., because

of dense adhesions, the fundus may be amputated and the lining mucous membrane removed.—(Stewart's *Surgery.*)

5.

CONCUSSION OF THE BRAIN.	COMPRESSION OF THE BRAIN.
Unconsciousness is incomplete; patient can be made to answer, though it may be briefly, and in simple words.	Complete unconsciousness; may scream into patient's ear at the top of the voice, but will receive no answer.
Special senses, though greatly blunted, are not abolished.	Special senses entirely suspended.
Power of movement not destroyed; if the position of a limb be changed the patient will resist or bring it immediately into the original position.	Complete or partial paralysis; in most cases hemiplegia.
Respiration is quiet and feeble.	Respiration full and noisy.
Pulse feeble, frequent, and intermittent.	Pulse full and slow, and sometimes laboring.
The stomach sickens and rejects its contents.	The stomach is insensible to any impression; no nausea or vomiting.
The feces may be discharged incontinently, as may also the urine, though not usually.	Bowels are torpid, and the bladder incapable of emptying itself, though the urine may escape by overflow.
Deglutition little impaired.	Deglutition difficult or impossible.
Pupils variable, though generally contracted; the eyelids somewhat open.	Pupils variable, though generally much dilated, and the eyelids closed.
Temperature of the body less than natural.	Temperature almost natural, a little below the normal standard.

—(From Treves' *Manual of Surgery.*)

Indications for trephining: Intracranial hemorrhage, abscess of brain, fracture of skull, epilepsy, tumors of brain, drainage of frontal sinus or mastoid cells, thrombosis of venous sinuses.

In *trephining,* a large semicircular flap should be turned down and the pericranium pushed back. The trephine, with the pin protruded 1/10 of an inch, should be then applied and steadily worked. The pin is removed when a

proper-sized groove has been formed in the bone. The crown of bone when removed should be kept in some weak antiseptic solution if it is intended to replace it at the end of the operation. The whole scalp should be shaved and thoroughly cleansed with antiseptic solutions before operation, and strict precautions against sepsis should be taken during the operation.

6. Intracranial hemorrhage is the indication for ligature of the middle meningeal artery. Trephine one and a quarter inches back of the external angular process, at the level of the upper border of the orbit.

8. *Symptoms of floating kidney:* They may be absent or there may be heavy, dragging pain in the abdomen aggravated by the erect posture, various gastrointestinal symptoms, melancholia, more or less hysteric symptoms, and the presence of the kidney in an abnormal location. The kidney sometimes becomes enlarged and sensitive, which is probably due to the twisting of the ureter and blood-vessels or to localized peritonitis. The diagnosis is made upon the size, shape, and location of the tumor.

"*Nephrorrhaphy* is an operation in which the kidney is exposed through a similar incision to that for nephrotomy, with the object of suturing a movable kidney fast in its normal position in the back; when the kidney has been reached, a number of sutures are introduced into the capsule of the kidney or the kidney itself, and secured to the fibrous and muscular tissue of the incision. Many surgeons prefer to omit the introduction of sutures, and simply scarify the capsule of the kidney or dissect off a portion of the capsule, and then pack the wound with strips of gauze and allow it to heal by granulation. Other methods of fixing a movable kidney consist in dissecting a flap from the capsule of the kidney and suturing it to the muscular tissues of the external wound before closing the wound. Some surgeons prefer to introduce no sutures, but to pass two gauze loops around the kidney at different points, and pack the wound with gauze. The loops are not removed for a few days, and the wound is allowed to heal by granulation.—(Wharton's *Honor Surgery.*)

9. With no further information than is given in the question, I would advise amputation, because so long as there is suppuration the bones cannot unite, and the gangrene is often an indication for amputation. This amputation should be performed well above the knee, where the arteries are sound. "In amputation in the *lower third* either a flap or a circular operation may be performed. In a double-flap operation a semi-lunar skin incision should be made from without inward, and the muscles should be cut by transfixion. In the lower third Teale's flap or the long anterior flap may be employed. The amputation by a long

anterior flap consists in making a lengthy skin flap, reflecting it, cutting the anterior structures to the bone, again entering the long knife at one angle of the incision, pushing it back of the femur, bringing it out at the outer angle, and cutting the structures behind the bone directly backward."—(Da Costa.)

10. *Empyremia* shows dullness or percussion, absent breath sounds over the pus, bulging of the intercostal spaces, dyspnea, pallor, cough, sweat, chills, and leucocytosis.

Resection of a portion of a rib is the usual operation, as it allows room for exploration and free drainage. The patient lies on his back and is brought to the edge of the table. A two or three inch incision, with its center in the midaxillary line, is made over the seventh rib, and the peritoneum divided, and separated from the entire circumference of the rib with closed curved scissors or a periosteal elevator. The rib is divided at each extremity of the incision with bone forceps and removed, the intercostal vessels having been pushed aside with the periosteum; the operation then proceeds as in thoracotomy without resection of the rib. Irrigation of the cavity should never be employed in acute cases, as it is occasionally followed by death. In chronic cases, however, in which the adhesions are firm, irrigation with sterile salt solution is often advisable, particularly if the discharge is very fetid. The tube is removed when the purulent discharge ceases. —(Stewart's *Surgery*.)

HYGIENE.

1. An *infectious* disease is one that is caused by a known microorganism; as typhoid fever, tuberculosis.

A *contagious* disease was formerly understood as one that was communicated by direct personal contact, as by touch, or exhalations from breath or skin; as measles, smallpox.

2. *Infectious diseases which may be conveyed through the medium of the air:* Tuberculosis, pneumonia, diphtheria, measles, scarlet fever, whooping cough, erysipelas, influenza.

Through the medium of food: Tuberculosis, diphtheria, typhoid fever, scarlet fever, cholera, beri-beri.

Through the medium of insects: Malaria, yellow fever, filariasis, typhoid fever, bubonic plague, tick fever, sleeping sickness.

3. Hookworm enters the body by infected food and drink or through the skin. It comes from the feces of those already infected. Cleanliness, proper toilet facilities, and burning or disinfection of the excreta of persons suffering from the disease will help to eliminate the trouble.

Wearing shoes rather than going barefoot should be encouraged; and water for drinking should be boiled.

4. Scarlet fever, ten days; diphtheria, twelve days; smallpox, sixteen days; measles, sixteen days; chickenpox, twenty days.

5. "To trace an epidemic to its source is not so much a study for the doctor as for the statistician, the detective, the bacteriologist, the chemist, and the engineer." Find out who have the disease, where they live, and when and where they were taken sick; investigate the use and source of water, milk, and food among the sick. If food or milk can be traced to one dealer, or food to the same source, much is accomplished; inspection of farms and dairies may be necessary. Oysters and "carriers" must be remembered.—(From Whipple's *Typhoid Fever.*)

6. Isolate the patient; give antitoxin to all who have been exposed; observe strict antiseptic precautions on behalf of all who have to come in contact with the patient; fumigate clothes, bedding, toys, furniture, etc., after the termination of the disease.

7. "An examination of the quality and purity of water for drinking purposes is a very complicated procedure requiring not only expert sanitary knowledge, but also a thorough training in chemical and bacterial analysis, and a capacity for weighing and comparing all data gained in order to base judgment on them." (Price's *Hygiene and Public Health.*) Such being the case, I should send samples of the water and of the milk to the proper authorities, and should advise that pending their decision such water and milk should not be used, or that the water should be boiled and filtered before using.

8. *Three reliable fumigation agents:* Sulphur dioxide, chlorine, and formaldehyde.

To *fumigate by sulphur dioxide:* For each 1,000 cubic feet of space, three pounds of sulphur are burned, care being taken to prevent accidents. In all cases all apertures and crevices of the room should be closed, all closets, drawers, or other receptacles opened; and after the fumigation the room should be well ventilated and thoroughly cleansed with a solution of corrosive sublimate.

9. Hygienic precautions to be taken in treating a case of tuberculosis: "The patient's quarters should be free from dust and admit of spending many hours daily in the open air in all weathers, properly sheltered, and, if very ill, lying wrapped in a hammock or reclining chair. His bedroom should be well aired at night, draughts being avoided. The room should be uncarpeted and free from hangings. It should be often cleaned and periodically disinfected. All sputum should be collected in paper spitcups, which should be burned daily. Smoking should be

forbidden. Harm is done by any exercise which results in fatigue, and while fever exists it should not be attempted at aii. Patients should be taught the necessity of practising lung gymnastics and breathing only through the nose, which should be kept clear and free from occlusion by secretions, or an hypertrophied catarrhal mucosa. * * * The clothing should be woolen, but not too heavy, or sweating is increased; and a flannel nightgown and loosely knit leggings should be worn at night in cool weather. The skin should be cleansed by daily sponge-baths of lukewarm alcohol and water."—(Thompson's *Practical Medicine.*)

10. *To secure and maintain a pure supply of cistern water:* The cistern should be properly built of the best materials; if any water is collected from roofs the first of such water should be allowed to run to waste so as to avoid contamination by anything that may have collected on the roof; the cistern should admit of easy inspection and cleansing, and it should be inspected and cleansed; the cistern should be covered, so as to exclude dirt, dust, animals, insects, etc.; light should also be excluded; the overflow pipe should discharge into the open air and should have its exit covered with wire netting to prevent the entrance of animals or foreign matter.

MEDICAL JURISPRUDENCE.

1. *Insanity* is "that state of disordered mind in which a person loses the power of regulating his actions or conduct according to the ordinary rules of society." (Taylor.).

"The best classification for legal purposes": (1) Idiocy; (2) imbecility; (3) mania; (4) melancholia; (5) monomania; (6) general paralysis of the insane; (7) dementia; (8) certain forms of mania without distinct etiological relations. (Dwight's *Medical Jurisprudence.*)

2. *"By superfetation* is meant that a second conception may occur during pregnancy, both children being carried through the double pregnancy, each being born at the full term; the interval of births is necessarily the same as that between the two conceptions.

"Distinction from twin pregnancies: These cases show an interval of only a number of hours or perhaps days between the births of the two children. The possibility of such an occurrence must be accepted, although they are extremely rare. Such cases, as far as is known, have never been brought into court. If they should be, one must recognize the possibility, and the questions must be decided by the development of the child and the recognized periods of duration of gestation." (Dwight's *Medical Jurisprudence.*)

3. *Impotence* is defined as the permanent incapacity for sexual intercourse; and *sterility* as inability to procreate, or a want of appetite in the female for impregnation.

4. *Elements of responsibility in criminal malpractice, and of relief from responsibility:* "A practitioner of medicine or surgery will be guilty of criminal malpractice: (1) When serious results follow on account of his gross ignorance or neglect. (2) When he uses medical or surgical methods which are prohibited by law. (3) When he makes use of unusual methods which are apt to endanger the life or health of his patient. (4) When he neglects to use such means as may be necessary for the safety of his patient. (5) He is liable for any bad result which may depend upon a want of knowledge or lack of care on his part. (6) He is required to exercise the amount of skill which may be reasonably expected from one under his conditions. (7) Gratuitous treatment does not relieve him from responsibility for the result. (8) He cannot be compelled to assume the care of any case without he so wishes, but, having accepted it, he cannot withdraw without giving suitable notice of his intention. (9) An action for malpractice cannot be brought after he has recovered in court for his services. (10) He is relieved from responsibility when the patient fails to follow his advice. (11) He is responsible for negligence or ignorance on the part of his assistants, but not for criminal acts on their part. (12) He is not responsible for errors in judgment in uncertain or difficult cases." (Dwight's *Medical Jurisprudence.*)

5. In the study of blood-stains the following questions have to be settled: (1) Are the stains caused by blood? (2) Was the blood of human origin? (3) If not of human origin, from what source did it come? (4) If of human origin, was it arterial or venous? (5) If of human origin, what can be learned as to the age, sex, etc., of the individual furnishing it? (6) Did it come from the living or dead?

The stains should be studied chemically by spectroscope, and by microscope.

To distinguish the human blood globule from that of other sources, a careful study is required of the shape and size, and presence or absence of nuclei. In case the question is between human blood and that from an animal whose blood closely simulates human blood, it may be very difficult or even impossible to determine between them.

6. In order to convict for infanticide, the law requires that it should be proved: (1) That sufficient uterine age and development have been reached to allow of a separate existence on the part of the child. (2) That the child

was born alive. (3) Proof of the manner of death. (Dwight.)

7. *Post-mortem signs in the newborn after asphyxia:* These are not conclusive; but the lungs show lack of distention and aeration, and the circulation is in the fetal condition, the brain may be congested, and there may or may not be marks of external violence.

After strangulation: Marks of external violence are present, ecchymoses may be found, brain is congested, heart (especially the right side) is engorged with blood, ecchymoses are present on pleura and pericardium.

"The *post-mortem signs presented by exposure to cold* in the newborn are very meager; the congestion of the brain, a more or less rosy tint of the blood, is perhaps the most important. A very moderate degree of exposure is sufficient to cause death in the newborn, and in such instances signs presented in death are comparatively few. The *indications of starvation* are, at autopsy, even more difficult to present as a definite conclusion. *Elements of evidence:* A suspicion will be aroused when the body of a child is studied in which the respiration and circulation have been thoroughly established, the meconium absent from the intestine, and in which no milk or other food is found in any portion of the digestive apparatus. When death occurs from starvation it is usually combined with exposure in one form or another." (Dwight's *Medical Jurisprudence.*)

8. Death may follow lightning so instantaneously as not to modify the position which the body held at the time of the shock; or it may follow later as the result of burns and lacerations; it may be due to the shock to the brain and nervous system.

Post-mortem appearances: "In those cases of sudden death by lightning in which the body is left in the position occupied at the time of the shock post-mortem rigidity comes on at once. In other cases it may be slower in its onset, but usually is rapid as compared with death from ordinary causes. The conditions found after death from electricity are not consistent; neither are they such as in unknown cases would establish the cause of death. Many observers have reported the rapid following of decomposition, but there seems in fact to be little evidence that such is the fact. The heart may be filled with blood, which may be liquid or clotted. The blood is usually dark, but a case has been reported in which it was of a "rosy, vermillion" color. There is usually a passive congestion of the various organs, including the brain, and small hemorrhages into its substance have been found. Small superficial hemorrhages are usually found scattered over the

surface of the lungs and heart." (Dwight's *Medical Jurisprudence.*)

The *medicolegal* interest is due to the fact that the victim of electricity presents certain conditions which simulate very closely the effects of homicidal violence.

9. See some good textbook on Pathology.

10. *Rape* has been defined as being the carnal knowledge of a woman against her will. But the element of will may or may not enter into the case; consent if it be obtained by fraud or from one mentally deficient, or under age, does not relieve the criminal from the charge of rape. Rape may also be perpetrated when the victim is unconscious or in such other condition as to interfere with the action of the will.

"Medical testimony in these cases has usually to do with three conditions: (1) The presence or absence of bruises, lacerations, or other signs of injury upon or about the genital organs. With regard to the evidence of lacerations of the hymen, it must be remembered that a certain number of hymens are so elastic as to permit of intercourse without laceration. (2) The presence or absence of spermatic or blood-stains upon the person or clothing of those concerned, and the presence or absence of spermatozoa in the vagina. (3) The presence of venereal disease in one or both." (Dwight's *Medical Jurisprudence.*)

STATE BOARD EXAMINATION QUESTIONS.

VERMONT STATE BOARD OF MEDICAL REGISTRATION.

ANATOMY.

1. Describe the tibia.
2. Describe the radiocarpal articulation.
3. Name the extensor muscles of the leg.
4. Describe the pericardium.
5. Give the origin and course of the pulmonary arteries.
6. Give the origin and distribution of the ulnar nerve.
7. Name the sinuses communicating with the nasal fossa.
8. Give nerve and blood supply of rectum.
9. Describe the mesentery.
10. Give location of Cowper's glands, and state where their ducts empty.

BACTERIOLOGY.

1. Give requisites for spore formation.
2. Describe some of the vital actions of bacteria.
3. What are mordants?
4. Describe a cover-glass preparation.
5. State the effect of antitoxin on bacteria.

PHYSIOLOGY.

1. Describe ciliated epithelium and (*a*) state where it is found most abundantly; (*b*) What is the function of ciliated epithelium?
2. Name some of the bodily states which lessen the alkalinity of the blood.
3. What is the office of the columnæ carneæ?
4. What post-mortem tests should be applied to prove that air has entered the lungs of a supposedly stillborn child?
5. Describe the functions, and secretions of the stomach.
6. What is the function in digestion of (*a*) saliva, (*b*) bile?
7. How do the products of digestion find their way into the blood?
8. What is the cerebrospinal system of nerves, and to what parts of the body are its fibers chiefly distributed?
9. State where in the human economy the following substances are found: 1. fibrin; 2. mucin; 3. chondrin; 4. leucin; 5. hippuric acid.
10. Name the structures in the body whose functions are doubtful or unknown.

HYGIENE.

1. Into what general classes are foods divided? Give examples of each.
2. Describe the physiological action of alcohol.
3. What hygienic precautions should be observed by a pregnant woman?
4. If a chemical analysis of water revealed the presence of nitrates and nitrites (*a*) would this condemn it for drinking purposes? (*b*) If so, why?
5. Describe the preparation of patient, surgeon, instruments, and surroundings for operative procedures.

MATERIA MEDICA AND THERAPEUTICS.

1. How do tinctures differ from spirits? Give an example of each.
2. State the sources and dose of salicylic acid.
3. What is the best solution for hypodermyoclysis?
4. Give the therapeutic uses of boric acid.
5. Describe the therapeutic uses of glycerin.
6. Define expectorant. Mention three expectorants and state dose of each.
7. What is animal, and what vegetable charcoal? Explain their use in medicine.
8. Mention four drugs considered among the best tonics, and describe their action.
9. Name the digestive ferments used in medical practice, and give their sources and therapeutic action.

10. What are useful drugs to allay mucous irritation? Explain their action.

CHEMISTRY.

1. What relation has chemistry to the practice of medicine?
2. What are the principal varieties of thermometers? Describe their differences, and explain the transposition of the scales.
3. Give the physical and chemical properties of urine.
4. How are soaps made? What constitutes (*a*) hard soap; (*b*) soft soap; (*c*) castile soap?
5. Define specific gravity, atomic weight, reaction, reagent, and water of crystallization.

PRACTICE OF MEDICINE.

1. Give the synonyms of relapsing fever and how may it be diagnosed?
2. Name six infectious diseases in which the specific organism has been isolated and six in which it has not.
3. (*a*) What are your ideas as to complete or partial quarantine in the diseases mentioned in your reply to Question 2? (*b*) Give your reasons.
4. What have you been taught as to the medical treatment of appendicitis?
5. What may be done for non-obstructive constipation other than through medicines?
6. What are the etiological factors of jaundice?
7. Write a short article on purpura hæmorrhagica.
8. Of what use in diagnosis are blood pressure tests?
9. Give treatment for general progressive arteriosclerosis.
10. Will be to demonstrate use of certain instruments of diagnosis.

PATHOLOGY.

1. Discuss albuminuria.
2. Give pathology of nephrolithiasis.
3. What post-mortem changes are found in general paresis?
4. What is the pathology in infantile paralysis?
5. What is the theory as to the location of lesion in occupation neuroses?

OBSTETRICS.

1. (*a*) Name the generative organs of the female. (*b*) Describe briefly the uterus, giving its gross anatomy, relations to other structures in the pelvis, and its function.
2. (*a*) Define the term menstruation. (*b*) At what age does it appear? (*c*) What name is given to the period of life during which it appears? (*d*) At what age does it

usually cease? (*c*) What name is given to the period of life during which it ceases?

3. (*a*) Name the bones which form the bony pelvis. (*b*) Give anteroposterior diameter of the brim. (*c*) Give transverse diameter of the outlet.

4. Upon what signs and symptoms would you base a diagnosis of pregnacy before the end of the third month?

5. (*a*) What is the normal duration of pregnancy in days? (*b*) What is the limit of its duration from a medicolegal point?

6. (*a*) How frequently would you examine the urine during pregnancy? (*b*) To what constituents, normal or abnormal, would you pay particular attention? (*c*) In the presence of edema of the face, hands and legs with albumen and casts in the urine, all of which increased in spite of proper treatment, what symptoms would lead you to bring on artificial labor?

7. Write a short article discussing the terms asepsis and antisepsis as applied to obstetrics.

8. Describe your attentions to the child from the time the head is born till it is delivered to the nurse, including the tying of the cord.

9. (*a*) What are the symptoms of impending eclampsia? (*b*) How would you treat them? (*c*) How would you treat the developed condition?

10. How would you guard against the occurrence of post-partum hemorrhage?

GYNECOLOGY.

1. Define the terms subinvolution, rectocele, pyosalpinx, cervicitis, metritis, vaginismus.

2. Describe the technique of catheterization.

3. What are the most common causes of sterility?

4. Give differential diagnosis between a small fibroid of the uterus and early pregnancy.

5. What are the dangers attending the use of the uterine sound?

SURGERY.

1. Give the symptoms of perinephritic abscess and describe the operation for its relief.

2. Diagnose tuberculosis of the hip-joint and give the treatment.

3. Mention the conditions requiring trephining of the skull. Describe the operation.

4. Diagnose gangrene, naming the different causes, and describe its management.

5. Classify ulcers of the leg and give treatment.

6. Give the symptoms and pathological anatomy of whitlow. Give the treatment.

7. Describe the symptoms of a perforating ulcer of the duodenum and give the surgical treatment.
8. Describe branchial cyst and the operation for its relief.
9. What are the symptoms of chronic ranula?
10. Mention the causes of post-operative ileus. Give the treatment for its relief.

LEGAL MEDICINE.

1. Mention the different signs of death and give methods for applying them.
2. What considerations would govern you in pronouncing death due to exposure to cold?
3. Describe the post-mortem appearances in death due to strangulation.
4. Mention means for detecting malingering in alleged cases of injury.
5. Differentiate the following: Hallucination, illusion, delusion, paranoia, paresis.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

VERMONT STATE BOARD OF MEDICAL REGISTRATION.

ANATOMY.

1. *Tibia* is the shin bone, or internal bone of the leg, and extends from knee to ankle. It consists of a shaft and upper and lower extremities. The shaft is triangular and prismatic in shape; its anterior border is subcutaneous, and forms the shin; on the posterior surface is an oblique line. The upper extremity is expanded, and presents the head, with two tuberosities, spinous process, tubercle, and popliteal notch. The lower extremity is quadrilateral, and from it projects the internal malleolus. It articulates above with the femur; with the fibula at top and bottom; and below with the astragalus. It has three points of ossification, one each for shaft, and upper and lower extremities.

2. *The radio-carpal*, or wrist joint, "is a condyloid joint consisting of an elliptical cavity formed by the radius and triangular cartilage, into which fits the convex surface of the scaphoid, semi-lunar, and cuneiform below. Its ligaments are external and internal lateral, anterior and posterior radio-carpal. *External lateral* passes from the styloid process of radius to the scaphoid, os magnum, and trapezium. *Internal lateral* passes from the styloid process of ulna to the cuneiform, pisiform, and annular ligament. The *anterior radio-carpal* is a broad membrane attached above to the anterior margin of the radius, its styloid

process and ulna, and below to cuneiform, semi-lunar, scaphoid, and os magnum, strengthened by a band extending from styloid process of ulna to semi-lunar and cuneiform. The *posterior radio-carpal* is attached to dorsal margin of radius, and below to cuneiform, semi-lunar, and scaphoid. The anterior and posterior radio-carpal belong to the annular ligament.—(Young's *Anatomy.*)

3. *Extensor muscles of the leg:* The muscles forming the quadriceps extensor (vastus externus, vastus internus, crureus, and rectus femoris).

4. The *pericardium* is a "fibro-serous membrane containing the heart and the commencement of the great vessels. The *apex* points upwards and surrounds the ascending aorta, superior vena cava, and pulmonary artery for about 2 inches—*i. e.*, to the level of the lower border of the aortic arch. The *base* is fixed to the central tendon and adjoining muscular fibres of the diaphragm.

The serous layer of the pericardium lines the inner surface of the pericardium, and is continued on to the surface of the heart, being also prolonged over the vessels in the pericardium. The aorta and pulmonary artery are enclosed in one sheath, and it surrounds the ends of the four pulmonary veins, forming a pouch posteriorily between the veins of the right and left sides. The part of the superior vena cava within the pericardium is also invested by it. The serous layer forms a reduplicature above and in front of the root of the left lung, enclosing the remains of the left superior vena cava; it reaches from the left superior intercostal vein downwards to the side of the left auricle, where it joins the serous investment round the left upper pulmonary."—(*Aids to Anatomy.*)

5. The *pulmonary artery* carries venous blood from the right ventricle to the lungs. It is about two inches in length, passes upward and backward to the left side to the under surface of the transverse portion of the arch of the aorta, where it divides into the right and left pulmonary arteries. It is attached to the under portion of the arch by a fibrous cord, the remains of the ductus arteriosus of fetal life. The right pulmonary artery is larger and longer than the left, and passes behind the ascending aorta and superior vena cava to the root of the right lung, where it divides into two branches. The left pulmonary artery passes in front of the descending aorta and left bronchus to the root of the left lung, where it divides into two branches.—(Young's *Anatomy.*)

6. The *ulnar nerve* has its origin in the inner cord of the brachial plexus, and derives its fibres from the eighth cervical and first dorsal. It is distributed to the skin of the forearm and hand, and to the flexor carpi ulnaris and the inner half of the flexor profundus digitorum.

7. *Sinuses communicating with the nasal fossa:* Sphenoidal sinus, anterior and posterior ethmoidal sinuses, maxillary sinus (antrum of Highmore), and frontal sinus.

8. RECTUM. *Nerve supply:* From sacral plexus, fourth sacral, and inferior hemorrhoidal nerves, and from inferior mesenteric and hypogastric plexuses. *Blood supply:* Superior hemorrhoidal, middle hemorrhoidal, and inferior hemorrhoidal arteries and veins.

9. *Mesentery* is a fold of peritoneum which connects the intestine with the posterior wall of the abdomen. At its root on the vertebral column it is about six inches in length; its intestinal border is about twenty feet in length.

10. *Cowper's glands* are situated between the two layers of the deep perineal fascia, on either side of the membranous urethra. Their ducts open on the floor of the bulbous portion of the urethra about one inch from the glands.

BACTERIOLOGY.

1. *"The conditions under which bacteria form spores* vary with the nature of the organism. The bacillus of anthrax, as a rule, forms spores only when in contact with free oxygen; the tetanus bacillus, on the other hand, and the anaërobes in general form spores in the entire absence of oxygen. A suitable temperature is essential to the formation of spores; the anthrax bacillus forms spores most abundantly at about 30° to 32° C., and will not produce spores below a temperature of about 12°. Lack of food is apparently not an adequate stimulus to spore formation. In all cases a period of uninterrupted vegetative multiplication precedes the appearance of spores, and the conditions necessary for the production of spores seem to arrive simultaneously for most of the cells in a culture. In at least some cases the cause of spore formation is to be found in an accumulation of metabolic products in the culture; these may perhaps be acids, perhaps other injurious compounds."—(Jordan's *Bacteriology.*)

2. *Some of the vital actions of bacteria:* Fermentation; putrefaction; production of colors, gases, acids, alkalies, odors, nitrites; liquefaction of gelatin; phosphorescence; and production of diseases.

3. *Mordants* are substances used in staining to make the dye or stain hold fast (or "bite").

4. *A cover glass preparation.*—"A small drop of the culture or suspected fluid, or a drop of water in which a small quantity of the solid culture has been rubbed up, is placed in the center of a cover-glass, the edges of which have been smeared with vaselin, and the special slide inverted over this in such a way as to bring the drop in

the center of the hollow. The slide is then quickly inverted and is ready for examination. The edge of the drop is now brought into focus with a dry lens, using a small diaphragm aperture, and then a 1/12-inch oil immersion substituted for this." It may be stained.

5. An antitoxin does not absolutely destroy the toxins produced by the bacteria, but rather nullifies their action. It is believed that the antitoxin and the toxin enter into a sort of loose chemical combination, and that so long as this combination exists the poisonous properties of the toxins are held in abeyance.

PHYSIOLOGY.

1. *Ciliated epithelium* is a form of epithelium consisting of simple columnar, or stratified columnar cells, on the free or exposed surface of which are a number of hair-like processes called cilia. These possess power of wave-like motion in one direction only. Ciliated epithelium is found in the greater part of the respiratory tract (except the vocal cords), Fallopian tubes, upper part of uterus, Eustachian tube, part of the excretory duct of the testicle, ventricles of the brain, and central canal of the spinal cord. Its *function* is motion and protection.

2. *The alkalinity of the blood may be lessened by:* (1) Great muscular exertion, (2) anemia, (3) rheumatism, (4) fevers, (5) diabetes, (6) cholera, and (7) uremic conditions.

3. *The office of the columnæ carneæ* is: To prevent too great dilatation of the ventricles; to regulate their contraction; and to prevent the auriculo-ventricular valves from being turned into the auricles.

4. If respiration has taken place, the lungs will float on being put into water; if respiration has not taken place, the lungs will sink. Further, the lungs before respiration are situated at the back of the thorax and do not fill the cavity; whereas, after respiration, they fill the whole cavity.

5. *The functions of the stomach* are: (1) The reception of food; (2) the secretion of gastric juice; (3) the thorough mixing of the food with the gastric juice; (4) the digestion of proteids; (5) and the absorption of such part of the food as is ready for absorption.

Gastric juice is a thin, colorless fluid; acid in reaction; specific gravity about 1002 to 1010; and containing about 1 per cent. of solids. The daily secretion amounts to 10 or 15 pints. It contains: Water, pepsin, rennin, hydrochloric acid, chlorides (of calcium, sodium, and potassium), and phosphates (of calcium, magnesium, and iron). Its function is to change proteids into proteoses and peptones, and to curdle the casein of milk; it is also slightly

antiseptic, and inverts cane sugar into dextrose and levulose.

The pepsin and rennin come from the central cells in the cardiac glands and from the cells of the pyloric glands. In both of these glands the pepsin preexists as pepsinogen. The hydrochloric acid is formed by the oxyntic cells. Just how a free acid is formed from the alkaline blood and lymph is not known. It has been suggested that it may occur as follows:

(1) $2Na_2HPO_4 + 3CaCl_2 = Ca_3(PO_4)_2 + 4NaCl + 2HCl$

or (2) $Na_2HPO_4 + H_2O + CO_2 = NaHCO_3 + NaH_2PO_4$;

and then $NaH_2PO_4 + NaCl = Na_2HPO_4 + HCl$.

6. The *saliva* begins to change the starches into dextrin and sugar; and the *bile* assists in the emulsification and saponification of fats, aids in the absorption of fats, promotes peristalsis, and also inhibits peptic digestion.

7. The products of digestion find their way into the blood by two routes: (1) By the blood-vessels of the gastrointestinal tract, which unite to form the portal vein; and (2) by the lymph vessels of the small intestine, which converge to empty into the thoracic duct. The water, inorganic salts, proteids and sugar go by way of the portal vein to the ascending vena cava; and the fats go by way of the thoracic duct to the junction of the left subclavian and internal jugular veins.

8. *The cerebrospinal system of nerves* consists of the nerves which are attached to the cerebrospinal axis (or such nerves as have their origin in the cerebrum, medulla, and spinal cord).

Its fibers are chiefly distributed to the voluntary muscles, the organs of special sense, skin, and other parts endowed with sensibility.

9. *Fibrin* is found in the blood and lymph; *mucin,* in saliva and synovial fluid; *chondrin,* in cartilage and bone; *leucin,* in spleen and pancreas; *hippuric acid,* in the urine.

10. *The functions of the following are doubtful, or unknown:* Spleen, thyroid, thymus, parathyroids, carotid and coccygeal glands, and the pituitary body.

HYGIENE.

1. *Foods are divided into:*

I. Inorganic. { Water. / Salts.

II. Organic. { Non-nitrogenous. { Carbohydrates. / Fats. } / Nitrogenous—Proteids. }

Example of each: *Carbohydrate,* sugar; *Fat,* fat of meat; *Proteid,* flesh of animals; *Salt,* sodium of chloride.

2. PHYSIOLOGICAL ACTION OF ALCOHOL. *Nervous system:*

Alcohol is first a powerful excitant, afterward a depressant; it increases the reflex activity of spinal cord, muscles, and nerves; in large doses it produces lack of co-ordination. *Circulatory system:* It stimulates the heart muscle and increases the rapidity and force of the heart beat; there is a rise of arterial pressure. *Respiration* is stimulated by small doses, and decreased by large ones. *Temperature:* Alcohol produces a sensation of warmth, and warms the extremities by causing the heart to pump hot blood from the center of the body to the cold parts. If used in excess the temperature rapidly falls, owing to increase of heat radiation and to depression of vital power. *Bodily metabolism:* Elimination of CO_2 is generally increased; the effect on absorption of O is not known. It adds force but not tissue to the body. *Elimination:* It is largely burnt up in the body, but in excessive doses it is eliminated by the breath, skin, kidneys, and intestines. *Digestion* is aided by moderate doses, but is disordered by large amounts. (From Hare's *Therapeutics.*)

3. *Hygienic precautions to be observed by a pregnant woman:* She requires pure air, mild outdoor exercise when possible, clothing free from constrictions of all kinds; cold and draughts must be avoided; warm baths should be taken at least three times a week; during the later weeks of pregnancy the nipples should be kept scrupulously clean, free from pressure, and softened by applications of borated vaselin or cocoa butter; sleep and ample rest are requisite; coitus should be avoided; crowded apartments, theaters, churches, etc., should be shunned; constipation should be corrected, and the urine should be examined every two weeks. (From Kings' *Obstetrics.*)

4. *Nitrates* are generally due to the oxidation of organic matter of animal origin.

Nitrites generally indicate sewage contamination. The presence of nitrites should condemn the water; so should a marked amount of nitrates.

5. "The *operating-room* should be as devoid of furnishings, hangings, etc., as possible, and should be freely ventilated, light, and warm. Its floor and walls should be frequently scrubbed and washed with antiseptics. Windows when open should be properly screened to prevent the ingress of insects. *Instruments* should be boiled for twenty minutes in 5 per cent. soda solution. *Ligatures* (catgut) may be prepared by any of the usual methods: boiling in alcohol, boiling in cumol, the formalin method, or soaking in potassium iodide-iodine solution. Silk and silk-worm-gut should be repeatedly boiled in saline solution. All *dressings* should be sterilized by steam or prolonged immersion in bichloride solution 1:2000. Paraphernalia of the operating-room should be wiped with a

cloth dipped in bichloride solution, 1:1000, shortly before operation. *Patient* should, if possible, receive a full bath and a cathartic the night before operation. The operation site should be scrubbed with soap and warm water and an antiseptic dressing applied, which should be removed just before operation, the site again washed with soap and water, followed by alcohol, ether, and bichloride solution 1:2000. The whole patient should be covered by a sterilized sheet or sterilized towels securely pinned together. The *surgeon* and assistants should don sterilized caps and masks. The hands and forearms should be thoroughly scrubbed with soap and running hot water for five minutes, special attention being paid to the nails, and the subungual space cleaned by a wooden stick, then immersed in alcohol followed by bichloride 1:2000 for three minutes, or in a saturated potassium permanganate solution, with or without the addition of bichloride 1:2000. This may remain on the hands during the operation, or the hands may at once be decolorized by saturated solution of oxalic acid, after which they are rinsed in sterile saline or a dilute bichloride solution 1:3000. The surgeon should then don a sterilized gown. All subsequent dressings should be done under antiseptic precautions as regards wound, dressings, instruments, and hands." (Scott's *State Board Physiology and Hygiene.*)

MATERIA MEDICA AND THERAPEUTICS.

1. *Tinctures* are solutions of non-volatile substances in alcohol or diluted alcohol. *Spirits* are solutions of volatile substances in alcohol or diluted alcohol. *Example:* Tincture of aconite; spirit of nitrous ether.

2. *Source of salicylic acid:* Certain plants (gaultheria and spiræa); it is also prepared synthetically from phenol and carbon dioxide, or from oil of wintergreen and solution of potash. *Dose,* 7 grains.

3. *The best solution for hypodermoclysis* is a physiological solution of sodium chloride (about 0.6 per cent.)

4. *Therapeutic uses of boric acid:* It is used as a mild antiseptic; sometimes it is given to correct fermentative dyspepsia, and also in cystitis.

5. *Therapeutic uses of glycerin:* As an emollient, laxative, and as a vehicle for other medicaments; it is sometimes given for hepatic and nephritic calculi, for trichinosis, and in vomiting of pregnancy.

6. An *expectorant* is an agent which modifies the secretion of the broncho-pulmonary mucous membrane, and promotes its expulsion. *Examples:* Fluidextract of squill, dose 2 minims; fluidextract of senega, dose 10 to 20 minims; tartar emetic, dose gr. 1/10.

7. *"Animal charcoal,* or bone-black, is prepared by burn-

ing bones in closed iron cylinders. It is composed of carbon and calcium carbonate and phosphate. *Purified animal charcoal* is bone-black from which the earthy salts have been removed by hydrochloric acid. *Vegetable charcoal or wood charcoal* is prepared from soft wood and is finely powdered. The dose is from ½ to 2 drams.

"Charcoal has the property of absorbing many times its own volume of gases or vapors. Owing to the oxygen condensed within its pores it has considerable oxidizing power, which may be utilized to destroy offensive gases, like hydrogen sulphid, and to hasten the decomposition of organic matter. Thorough wetting destroys its activity. As it is not absorbed when taken internally it exerts no specific action on the body. Charcoal is employed chiefly as an absorbent and a deodorant. In the form of a poultice it was at one time a favorite application for foul ulcers, but it has been largely displaced by more cleanly dressings. While it is a satisfactory agent for deodorizing fecal discharges it has less disintegrating action than dry earth. Internally it is sometimes useful as an absorbent in flatulent dyspepsia. It may be given as a powder or in lozenges. Animal charcoal is not used for medicinal purposes, but it is largely employed by chemists for removing coloring-matter from alkaloids. It was formerly regarded as an excellent filtering medium for drinking-water, but it has been shown to be unsafe for this purpose, since by adding phosphates and nitrates to the water it actually favors the development of bacteria." (Stevens' *Materia Medica*, etc.)

8. *Four tonics:* Strychnine, iron, quinine, and arsenic.

Strychnine raises the blood pressure, stimulates the medulla and spinal cord, sharpens the special sense organs, quickens and strengthens the respirations, increases the appetite and gastric secretions. *Iron* may increase the hemoglobin and number of red blood corpuscles. *Quinine* sharpens the appetite and promotes gastric peristalsis. *Arsenic* increases the pulse rate and the number of red-blood corpuscles, stimulates the nervous system, increases the appetite and favors digestion.

9. There are only two *official* digestive ferments, viz., pepsin and pancreatin. Trypsin is also a digestive ferment.

Pepsin is indicated as an aid to gastric digestion in gastralgia, gastric cancer and ulcer, atonic dyspepsia, and the vomiting of pregnancy.

Pancreatin is indicated as an aid to digestion, and for the predigestion of food, in convalescence, in wasting diseases, and in intestinal dyspepsia.

10. Demulcents and emollients are useful drugs to allay mucous irritation. Their chief action is mechanical and

protective; they may also aid in subduing pain. The chief are: Flaxseed, acacia, tragacanth, marshmallow, licorice, white of egg, oils of various kinds, petrolatum, and glycerin.

CHEMISTRY.

1. Since chemistry enters into almost every branch of medical science,a knowledge of chemistry is of the very first importance to the practitioner of medicine; physiology and its many problems are largely based on chemistry; toxicology and materia medica cannot be understood without chemistry; bacteriology, pathology, the newer studies in immunity, problems in diagnosis, hygiene, antisepsis, etc., depend to a great extent on chemistry.

2. "Thermometers are instruments for the measurement of temperature. They are usually glass tubes having a bulb blown at one end and closed at the other, the bulb and part of the tube being filled with mercury or with alcohol, whose contraction or expansion indicates a fall or rise of temperature. . . . In every thermometer there are two fixed points, determined by experiment. The lower, or freezing point, is fixed by immersing the instrument in melting ice, and marking the level of the mercury in the tube upon the glass when it has become stationary. The higher, or boiling point, is similarly fixed by suspending the instrument in the steam from boiling water. The instrument is then graduated according to one of three scales: the Celsius, or Centigrade, the Fahrenheit, and the Réaumur. The freezing point is marked 0° in the Centigrade and Réaumur scales, and 32° in the Fahrenheit. The boiling point is marked 100° in the Centigrade, 212° in the Fahrenheit, and 80° in the Réaumur scale. The space between the fixed points is divided into 100 equal degrees in the Centigrade scale, into 180° in the Fahrenheit, and into 80° in the Réaumur." (Witthaus' *Manual of Chemistry.*)

To convert the readings of one scale into terms of the others:

$$C° = \frac{5}{9}(F° - 32) \qquad C° = \frac{5}{4}R°$$

$$F° = \frac{9}{5}C° + 32 \qquad F° = \frac{9}{4}R° + 32$$

$$R° = \frac{4}{5}C° \qquad R° = \frac{4}{9}(F° - 32)$$

3. *Urine* is a fluid, of a yellowish color, acid reaction, specific gravity of about 1015 to 1025, characteristic odor. It is made up of: water, urea, uric acid, hippuric acid, creatinin, creatin, xanthin, pigments; chlorides, sulphates,

and phosphates (of calcium, sodium, potassium, magnesium, and ammonium).

4. Soaps are made by the action of an alkali on a fat. A *hard* soap is made with sodium hydroxide; a *soft* soap, with potassium hydroxide; *Castile* soap is a sodium soap made from olive oil.

5. *Specific gravity* is the weight of a given volume of a substance as compared with the weight of a like volume of some other substances taken as a standard, under similar conditions of temperature and pressure.

Atomic weight is the weight of an atom of an element as compared with the weight of an atom of hydrogen.

Reaction is the expression (by means of symbols, numbers and signs) of a chemical action. It is also used with reference to the action of substances upon certain organic pigments.

Reagent is a substance (or agent) used to bring about a reaction.

Water of crystallization. "Many substances, upon assuming the crystalline form, take with them a definite number of molecules of water, which are necessary to the maintenance of the peculiar form, and frequently the color, but which in no way modify the chemical properties of the substance. It is called water of crystallization." (Witthaus' *Essentials of Chemistry.*)

PRACTICE OF MEDICINE.

1. Relapsing fever is also called recurrent fever, relapsing typhus, seven-day fever and famine fever. It may be diagnosed by the finding of the spirochete of Obermeier in the blood during a febrile period.

2. *Six infectious diseases in which the specific organism has been isolated:* Typhoid fever, diphtheria, tuberculosis, syphilis, erysipelas, plague.

Six in which it has not: Rheumatism, scarlet fever, measles, mumps, dengue, typhus fever.

3. Strict quarantine should certainly be enforced in all of the diseases named except rheumatism. In rheumatism there is not the same fear of an epidemic, or even of contagion. Syphilis *should* be quarantined, but public opinion has not yet been educated up to this; patients should be warned of the infectious nature of the disease.

4. The patient is put to bed and placed upon a milk diet. Free catharsis is induced by calomel and the salines. Rectal enemata are given. A blister over the epigastrium sometimes relieves the pain. The application of heat or cold has the same effect. Opium should be used sparingly, as it tends to mask the symptoms. In general terms, if the symptoms improve, delay in operation is advisable; if progressively growing worse, operation should be per-

formed at once. If the attack is the second one, early operation should be urged.

5. Regular habit of emptying the bowel every day at a fixed time; exercise; abdominal bands; massage of abdomen; food and fruit that are laxative; all these have been recommended.

6. Foreign bodies in gall ducts, inflammation of gall ducts, tumors within or without the gall ducts, certain infectious diseases.

7. *Purpura hæmorrhagica* consists of an extravasation of blood in the skin, and bleeding from the mucous membrane. It arises without obvious cause; bad hygiene is said to predispose. There is some fever, headache and malaise at the onset, and a series of small hemorrhages are noticed in the skin and mucous membranes; there is some anemia. Mild cases soon recover; relapses are common; severe cases may prove fatal.

8. *Abnormally high blood pressure* is found in: Chronic interstitial nephritis, arteriosclerosis, nervous excitement, uremia, gout, lead poisoning, and cerebral hemorrhage.

Abnormally low blood pressure is found in: Shock, collapse, concealed hemorrhage, acute infectious diseases and anemias.

9. Remove the cause; forbid alcohol; restrict animal food, tea and coffee; give diuretics and diaphoretics; gentle exercise and massage are also beneficial.

PATHOLOGY.

1. *Albuminuria.* "Minute traces of serum-albumin probably occur in the normal urine. The term albuminuria, however, is applied to cases in which albumin is readily detected. It may be accidental—that is, dependent upon the admixture of albuminous substances from the mucous membrane lining the urinary passages—or essentially renal in character. In the former instances the presence of abundant blood or pus-cells indicates the nature of the case. True renal albuminuria consists of the excretion with the urine of serum-albumin and serum-globulin, the former being considerably more abundant than the latter. Pure serumuria is extremely rare, and pure globulinuria perhaps even more so.

"Albuminuria is more frequently the product of actual renal disease or nephritis, and is then due to the disease of the epithelium of the glomeruli and tubules. A certain amount of albumin occurs in degenerative or congested conditions of the kidneys; in various general diseases affecting the blood without manifest disease of the kidney, such as anemias, diabetes, and the like; in certain nervous affections probably influencing the circulation; and in disorders of the digestive tract.

"At times albuminuria is periodic or cyclic, this periodicity depending upon general conditions, such as diet, exposure, and exercise, which, in turn, affect the blood or renal circulation. Considerable amounts of albumin in the urine are never physiologic.

"Large proportions of globulin occur in amyloid disease of the kidneys."—(Stengel's *Pathology.*)

2. *Nephrolithiasis:* "Calculi of appreciable size are made up of concentric layers arranged around a nucleus often of quite different composition. The nucleus may consist of crystals of uric acid or oxalate of lime, or of colloid bodies such as mucin, epithelia, or tube casts. The laminæ are composed of uric acid (the commonest form), oxalate of lime, alternate layers of uric acid and oxalate, or sometimes phosphate of lime and triple phosphates deposited upon a nucleus of one of the other crystals. This occurs in the presence of ammoniacal decomposition of the urine in the pelvis, as sometimes in pyonephrosis. Other forms of calculi (cystine, xanthine, etc.) are very rare.

"Uric acid calculi are of a reddish color, hard, smooth, and, if they are multiple, faceted on the opposing surfaces. Oxalate calculi are very hard, grayish, smooth, and rounded while small, but when they become larger presenting a rough, tuberculated surface ('mulberry calculi'). Phosphatic calculi may grow to a great size by continual deposition of phosphates from the alkaline urine. They tend to assume the shape of the pelvis and calyces, and form 'dendritic' masses. A calculus generally sets up some degree of pyelitis, which may be suppurative, and lead to pyonephrosis. If the ureter be obstructed, the kidney may atrophy, or hydronephrosis may follow. Malignant tumors have been attributed to the continued irritation of the calculus. If both ureters be obstructed, anuria and the symptoms of latent uræmia will follow."—(Wheeler and Jack.)

3. *General paresis.* "The post-mortem appearances vary greatly. In some cases little anatomical change has been discovered; but usually the following conditions exist: (1) Thickening of the inner table of the skull, which is marked by Pacchionian bodies; (2) thickening of the membranes, with hemorrhages between the brain and dura mater; (3) degeneration of cerebral blood-vessels; (4) patches of sclerosis throughout the white matter of the cord and brain; (5) atrophy of the frontal and central lobes; (6) distension of the ventricles by fluid.

"*Microscopically,* the following changes are found: Thickening of the pia arachnoid, overgrowth of the neuralgia, partial or complete destruction of the nerve-cells. The association fibers are absent or greatly diminished. It

is a disease of impaired metabolism or the neurons."—(Wheeler and Jack.)

4. "The lesions may be unilateral or bilateral, and are more common in the lumbar region. Early in the disease the blood-vessels of the anterior horns of the gray matter are distended, and the perivascular lymph-spaces filled with round-cells. Small interstitial hemorrhages may be present in the anterior horns. The ganglion-cells become larger, granular, and cloudy, often vacuolated, and altered in their staining reactions. The cells eventually become completely degenerated and disappear, the medullated nerves lose their covering, and many are destroyed. Neurogliar hyperplasia occurs in the involved areas, and the gray matter may become much indurated."—(McConnell's *Pathology.*)

5. In *occupation neuroses,* "the nature of the disorder is not known; it has been variously ascribed to disorders of the muscles, the peripheral nerves, and the cerebral cortex; it is likely that much of the disorder emanates from the cells of the cerebral cortex, which perhaps become exhausted from the necessarily prolonged effort to innervate the muscles; but whether this is the whole process is doubtful." (Kelly's *Practice of Medicine.*)

OBSTETRICS.

1. Ovaries, Fallopian tubes, uterus, vagina, labia majora, labia minora, fourchette, vestibule, perineum, mons veneris, clitoris.

In the nulliparous adult the *uterus* is about three inches long, about two inches wide at the upper part, and about one inch thick. It is pear-shaped, and lies between the rectum behind and the bladder in front; it is below the abdominal cavity and above the vagina. Its position is one of slight anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine, rectouterine, ovarian, and uterosacral. The arteries are the uterine and ovarian; the nerves are from the uterovaginal plexus, the hypogastric plexus, and the vesical plexus.

Function of uterus: To receive and lodge the fecundated ovum; to retain the fetus till it is mature, and then expel it.

2. (*a*) Menstruation is the series of phenomena which occur periodically in the non-pregnant adult female from puberty to the menopause, consisting chiefly in a bloody dis-

charge from the genital canal, and accompanied by various physical and psychical manifestations.

(*b*) It generally appears at about the fourteenth year.

(*c*) Menacme.

(*d*) It usually ceases at about 45 to 50 years of age.

(*e*) This period is called the *menopause*.

3. (*a*) Two ossa innominata (each consisting of ilium, ischium, and pubic bone), sacrum, and coccyx.

(*b*) The anterio-posterior diameter of the brim is about 4 or 4⅓ inches.

(*c*) The transverse diameter of the outlet is about 4 or 4⅓ inches.

4. Enlargement and softening of uterus, softening of cervix, enlargement of breasts, Hegar's sign, cessation of menstruation, and nausea, and vomiting (none certain).

5. (*a*) The normal duration of pregnancy is about 278 or 280 days.

(*b*) In this country there are no legal limits to the duration of pregnancy. Each case must be taken on its own merits, and will probably depend upon many factors, such as: (1) The special conditions in each case; (2) the truthfulness or untruthfulness of the witness and her lawyers; (3) the gullibility of the jury.

6. (*a*) In the early period, about once in two weeks; later, once a week, or even twice a week.

(*b*) I would pay particular attention to the amount of solids excreted (particularly to the urea), also to the presence of albumin, casts, and sugar.

(*c*) See Jellett's "Midwifery" (1910), pages 592 and 617; or Hirst's "Obstetrics" (1909), pages 249 and 630.

7. "The aseptic management of normal labor aims to *prevent* infection. The prophylaxis consists in thorough disinfection of the *patient*, the *physician*, and the *instruments* and *appliances* employed. The simplest method is as follows: The *patient*, at the beginning of labor takes a tepid bath and is well scrubbed all over with soap and water. Then an enema of soap and water to empty the bowel; after the action of which, the external genitals, thighs, buttocks, and abdomen are carefully washed with a 1:2000 bichloride solution, special attention being given to overlook no fold or fissure of the surface. The vaginal douche, of 2 per cent. creolin solution, or the weak solution of bichloride of mercury formerly used before labor, has been abandoned, unless there be some already existing infection, when it may be used. The normal vaginal mucus is itself germicidal in some degree, as well as a useful lubricant, and should therefore be allowed to remain undisturbed. Moreover, washing out the vagina exposes the woman to some danger of infection from an unclean syringe. The *physician*, before making any examination or

doing any operation, removes his coat, bares the arms to above the elbows, when the hands and arms are thoroughly scrubbed with soap, water, and a stiff nail-brush. Scrape the under surface of the nail-ends and the fissures surrounding the nails with some pointed instrument, not sharp enough to scratch, and having washed off all soap in some clean water, immerse the hands and leave the arms in a 1:2000 bichloride solution, and continue this last washing for ten minutes."—(King's *Obstetrics.*)

8. "After the cord has been ligated and cut, the eyes should be cleansed with a saturated solution of boric acid, after which, if there is any vaginal discharge from the mother, one or two drops of a 1 per cent. solution of silver nitrate should be instilled in each eye. The mouth should also be gently cleansed, for which may be used a soft cloth and boiled water. The vernix caseosa should be removed by means of some oily substance. The baby should be bathed in water at 100° F., carefully dried, and the cord dusted with some antiseptic powder. Sponging should be practised for ten days, after which a full tub-bath at 98° F. should be given daily for six months. The temperature may then be reduced to 95° F. The binder and clothing should be woolen. If the infant's extremities are blue or cold, external heat should be applied. The diapers should be made of flannel, and dusting powders should be used to prevent chafing. An infant may be taken out-of-doors in summer when one week old, and in winter, on pleasant days, at three months of age. The new-born infant should sleep about 22 hours out of a possible 24, gradually diminishing this until at two years the child should sleep at least 12 hours of the day, and at three years not less than 11. The sleeping room should be well ventilated."—(Gould and Pyles' *Pocket Cyclopedia.*)

9. *Symptoms of impending eclampsia:* Headache, nausea, vomiting, pain over stomach, vertigo, ringing in ears, flashes of light, blindness, mental disturbances. *Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:* (1) Control the convulsions (by chloroform, veratrum, or chloral); (2) eliminate the poison or poisons which are presumed to cause the convulsions; (3) empty the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

10. I should remain near the patient if her pulse was 90 or over; I should have everything in readiness for a hemorrhage; I should see that the uterus was contracting.

GYNECOLOGY.

1. *Subinvolution* is failure on the part of the uterus to "involute" after childbirth; the uterus remains abnormally large.

Rectocele is a bulging (of the rectum) into the posterior vaginal wall, generally due to relaxed tissues or lacerated perineum.

Pyosalpinx is a purulent inflammation of the Fallopian tube.

Cervicitis is inflammation of the cervix of the uterus.

Metritis is inflammation of the wall of the body of the uterus.

Vaginismus is a condition characterized by painful and spasmodic contraction of the vaginal orifice, more or less preventing coitus.

2. "A soft-rubber catheter is to be preferred, because it is incapable of doing any harm, does not irritate the urethra, and is easily cleansed and kept clean. After being used it should be rinsed out and should be kept permanently immersed in a 1:2000 solution of sublimate. Before being used it must be dipped in a basin of sterile water, and its tip should then be oiled. The hands of the individual who inserts it must be aseptic. It saves time and is safer to wear rubber gloves, which have been soaked in a 1:1000 sublimate solution or have been boiled. To introduce the catheter, it is necessary to expose the urethra to view, to wipe off its orifice, as well as the surrounding mucous membrane, with a piece of absorbent cotton moistened with a sublimate solution, 1:2000. The catheter is then inserted directly into the urethra, so that it does not carry with it into the bladder some of the decomposing vaginal discharge, which would be likely to set up a very troublesome or a very dangerous cystitis." (Hirst's *Obstetrics.*)

3. *The most common causes of sterility* are: Gonorrhea; malformation, maldevelopment or absence of any part of the genital tract; obesity; alcoholism; fistulæ; traumatisms; dyspareunia; pelvic inflammations; lacerations; anemia; incompatibility; frequently the cause is to be found in the male.

4. To differentiate a small uterine fibroid from early pregnancy the following table (from Dudley's "Gynecology") will help; but the course of time will *prove the diagnosis.*

PREGNANCY.	FIBROID.
1. History of pregnancy.	1. Absent.
2. Uterus soft and elastic.	2. Usually irregular in form and harder.
3. Consistence varies with uterine contractions.	3. Uterine contractions not marked—very important sign.
4. Cervix soft.	4. Hard or not so soft.
5. Regular and uniform increase in size of uterus.	5. Growth slower and irregular.
6. Later, ballottement, fetal heart-tones.	6. Absent.
7. Palpation of fetus.	7. Palpation of myoma.

5. The dangers attending the use of the uterine sound are: Sepsis, perforation, hemorrhage, and induction of abortion.

SURGERY.

1. *Symptoms:* Pain in the loins, tenderness on pressure, sometimes edema, rigors, fever. Treatment is incision and drainage. The incision should be made at the outer border of the erector spinæ.

2. HIP-JOINT DISEASE. *Symptoms of first stage:* Night cries, lameness in the morning; a slight limp; tendency to become tired on slight exertion; wasting; spasm; pain; swelling and deformity (either real or apparent).

Symptoms of second stage: Abduction; limping; pain, which is worse at night; apparent lengthening of the limb; abscess; atrophy of thigh muscles; flexion of thigh; effusion into hip joint; and there may be crepitation in the joint.

Symptoms of third stage: Flexion, adduction, and shortening of the limb; the joint may be dislocated or ankyloosed, or suppuration may occur.

"*Treatment:* In the early stages the patient must be kept in bed, with a weight extension applied in the line which the thigh takes, and as the flexion disappears, the pulley is lowered. When the pain has disappeared and the limb is horizontal, the patient can get about with a Thomas's hip-splint, a patten on the sound leg, and a pair of crutches. These must be worn for at least six months after symptoms have disappeared. The general health must be attended to by good feeding, sunshine, and fresh air. Phelps box is a useful apparatus in this stage. If abscesses form, they should be opened, scraped out with a flushing spoon, and stitched up. Excision of the head of the femur and free scraping out of the joint by the anterior incision is sometimes done in the early stage; but much shortening and a weak, movable joint are the

results, while complete removal of all the diseased tissues is difficult. However, excision should be done where the disease progresses in spite of treatment, and where the disease is primarily acetabular. In the *late stages,* where septic sinuses are present, the head of the femur should be excised by the posterior incision, diseased bone removed from the acetabulum, and the tuberculous synovial membrane completely dissected away. Amputation is required if the disease still progresses, if amyloid disease has commenced, or if the patient's general health is too low to stand a prolonged operation."—(*Aids to Surgery.*)

3. *Indications for trephining:* "Intracranial hemorrhage; abscess; fracture; foreign body; evacuation of cerebrospinal fluid through the lateral ventricle; as a preliminary step to osteoplastic resection and to linear craniectomy; epilepsy; bullet and other wounds; small tumors; drainage of frontal sinus; drainage of mastoid antrum and cells; thrombosis of venous sinuses." (Bickham's *Operative Surgery.*)

"If a wound is already present in the scalp, exposing the skull, as in the cases of compound fracture of the skull, it is exposed and bared, so that the crown of the trephine may be placed fairly on the bone; if no wound exists, a U-shaped flap is made, including all the structures down to the bone. The base of the flap should be so situated as to contain a sufficient blood-supply, and the flap should be so planned as to favor drainage from the wound. When the bone has been exposed, the trephine is placed withthe center pin projecting about one-sixteenth of an inch, and the instrument is turned from right to left until a groove is made in the bone; the trephine is then removed, and the center pin is raised so that as the teeth approach the inner table of the skull the point of the center pin will not injure the membranes or brain. The instrument is then reapplied and worked cautiously as the groove in the bone is deepened. When the diploë is reached, there is usually some bleeding from the wound, and as the trephine approaches the inner table of the skull it should be manipulated with great care, and when the resistance is felt to diminish at any one part of the bone the trephine is made to cut at other points of the bone where resistance is still apparent. When the disk is completely cut through, it may be lifted out in the crown of the trephine or may be removed with forceps or an elevator."—(Wharton's *Minor Surgery.*)

4. *Gangrene.* "Mortification, or death in mass, of a portion of living tissue, in contradistinction to ulceration, or death of molecular parts too small to be seen. Gangrene may be *dry, moist,* or *septic,* and may result from traumatism or infective organisms.

"*Causes:* The local causes are injuries, caustics, heat and cold, ligature, embolism, strangulation of the part, continued pressure, etc. The constitutional causes are deficient blood supply, senility, diabetes, infectious fevers, embolism, ergotism, certain nervous diseases, and septic infection.

"*Treatment:* The underlying cause should be removed if possible, and attempts should be made to reestablish the circulation by external heat and friction. When *dry gangrene* has occurred, amputation should not be done until the line of demarcation has formed. Antiseptics should be used locally, and tonics and stimulants given internally. *Moist gangrene* requires the same treatment. *Traumatic gangrene,* when it is spreading, requires amputation through the healthy tissues at once. *Hospital gangrene* is rare, and is treated by antiseptic lotions and bromine amputation, and general stimulation. *Symmetric* or *Raynaud's gangrene* and *frost-bite* require rest in bed, elevation, external heat, massage to the parts, and removal of the dead structures after the line of demarcation has formed. *Diabetic gangrene* requires immediate amputation. *Cancrum oris* and *phagedena* necessitate the use of active cauterizing agents, antiseptics, and general stimulation."—(*Pocket Cyclopedia.*)

5. *Ulcers of the leg are:* Varicose, acute, chronic, irritable, tuberculous, syphilitic. *Treatment:* Rest, elevation, pressure, dressings, incisions, ligating varicose veins, and skin-grafting.

6. *Whitlow* is a common result of poisoned wounds of the fingers. There are four varieties: (1) *Subucticular,* in which pus forms under the cuticle. Incision and fomentations are the treatment. (2) *Subcutaneous,* in which spreading cellulitis occurs in the finger. An early free incision rapidly relieves this condition. 3. *Thecal* form, in which the suppuration is in the tendon sheath. There is swelling, severe pain, sleeplessness, and inability to bend the finger. The trouble may spread to the common palmar sheath if it begins in the little finger. An early free incision is necessary. If this is delayed, the tendon may slough, stiffness remain, or suppuration extend into the forearm. (4) *Subperiosteal* whitlow may lead to necrosis of the phalanx. Again an early free incision is necessary. All should be treated afterwards with antiseptic fomentations.

There is severe pain, increased by movement or dependent position. Swelling and discoloration are present.

7. *Perforating ulcer of duodenum.* Sudden and severe abdominal pain, tenderness, vomiting, rapid pulse, shock. The only treatment is operation. The abdomen should be opened, bleeding vessels ligated, the outer coats of the

bowel should be brought together over the indurated area, and posterior gastro-jejunostomy should be performed.

8. A branchial cyst forms in a branchial cleft. It consists of epithelium from the skin or pharynx; they are smooth and fluctuating, often quite deeply situated. The cutaneous openings are along the anterior margin of the sterno-mastoid.

Treatment: In old children and in adults it may be possible to extirpate, although this is very difficult and often impossible. Other methods employed are incision, cauterization with the Paquelin cautery, and packing with gauze; frequent tapping and injection with iodine; incision and drainage, every antiseptic care being observed. In all young children and in some older persons with deep cysts, the latter plan is the only one advised, and it will often fail, but will sometimes produce a cure. —(Da Costa.)

9. A swelling, cyst, on floor of mouth, pushing tongue to one side. Talking and deglutition are difficult.

10. *Causes of post-operative ileus:* Paralysis of the muscular coat of the intestines; violent irritation. Treatment is laparotomy.

LEGAL MEDICINE.

1. *Phenomena and signs of death,* are: The complete and permanent cessation of circulation and respiration, rigor mortis, loss of body heat, pallor of the body, putrefaction.

For methods of applying the tests, see a good text-book on medical jurisprudence.

2. *Prolonged exposure to cold* causes first a lividity and then a whiteness of the extremities, ears, nose, and cheeks; this may be followed by gangrene. Pain, depression, stiffness, and congestion follow; stupor, coma, and death may supervene.

Post-mortem appearances: The skin is pale and waxy, with irregular dusky, reddish patches; the superficial parts are bloodless, while the viscera, including the brain, are congested; the heart and large vessels leading from it are full of blood, and the blood is of a brighter red color than usual.

The post-mortem changes in death from freezing are not sufficiently characteristic to justify a positive opinion on the subject. But if the body were found putrefied, it would be evidence that death was not due to freezing, for intense cold hinders putrefaction. So, too, the posture of the body might afford some aid; if the body is found in a crouching posture, death was *probably* due to freezing, as that attitude is characteristic.

3. In *death by strangulation:* The blood is of a dark color, owing to complete reduction of the hemoglobin. The

proportion of carbonic acid is increased, and owing to its excess the blood coagulates slowly or imperfectly; hence it remains fluid or forms few and soft coagula. The large veins, the pulmonary artery, and the cavities of the right side of the heart may be distended with dark fluid blood, but this is by no means necessarily the case. The left side is usually empty or nearly so. The lungs may be congested, but are often pallid and anemic, though the dependent parts usually exhibit appearances of hypostatic engorgement. The abdominal viscera, especially the kidneys, are often congested. The appearance of the brain varies; it may be anemic or more or less congested. Special signs characterize special modes of causation of asphyxia.—(From Quain's *Dictionary of Medicine.*)

4. A *malingerer* is one who pretends to be ill when he is not. To aid in the discovery: Try to ascertain if there is any motive in such claim to be ill; make frequent and thorough examinations; the examiner should be well read and expert; instruments of precision and anesthetics should be used if necessary; malingerers are apt to overdo their part.

5. A *delusion* is a belief in something which has no real existence, but is purely imaginary; and out of which the person cannot be reasoned. An *illusion* is a false or perverted impression received through one of the senses. An *hallucination* is the same as an illusion but without any material basis.

If an individual believes himself to be made of glass, and is afraid of being touched lest he be broken, he is suffering from a *delusion.* If the whistling of the wind is mistaken for a voice telling a person to do a certain thing—that would be an *illusion.* If a person fancied he heard a voice when there was nothing at all to be heard that would be an *hallucination.*

Paranoia "is a form of insanity which comes especially under the class of degenerative diseases. It is essentially characterized by a delusion or delusions of a fixed and systematized character. They are usually indeed of one kind, and the disease has perhaps for this reason been called monomania. This is, however, an unfortunate term, as we find this symptom not infrequently in other forms of insanity, as melancholia, where we always observe decidedly fixed ideas of depression. The main fundamental characteristic of this disease is a delusion which has become a part of the belief of the individual, and which he believes himself able to explain and defend."—(Witthaus and Becker's *Medical Jurisprudence,* etc.)

Paresis is partial or general paralysis.

STATE BOARD EXAMINATION QUESTIONS.

VIRGINIA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. Describe the spine and give the general characters of vertebra.
2. Name and describe the muscles of the orbit.
3. Name the branches of the axillary artery and give its relation in its third portion.
4. What is the lymphatic system? Describe the thoracic and right lymphatic ducts.
5. Name the nine regions into which the abdomen is divided, giving their boundaries and contents.
6. Describe the superior radio-ulnar articulation.

HISTOLOGY.

1. (*a*) Name the elementary tissues of the body and give the morphological constituents of each. (*b*) Describe a cell.
2. Name the varieties of muscle tissue and give general distribution of each variety.
3. Give the two principal component parts of the nervous system. Briefly describe and give function of each.
4. Give the histological structure of the stomach.

EMBRYOLOGY.

1. What relation do the Wolffian ducts and the ducts of Muller bear to the sex of the fetus?
2. What is the difference between the human ovum and the ovum of the fowl as regards the nourishment of the embryo?

PHYSIOLOGY.

1. Give distribution and chief functions of vagus.
2. What is meant by an afferent impulse; an efferent impulse; by reflex act?
3. Give names and locations of the three salivary glands, with the manner of communicating with the mouth.
4. What part does saliva play in digestion?
5. Give composition of bile and its function in digestion.
6. What channels does the blood pass through in the systemic circulation, from leaving the heart till return to same? What changes take place in blood in each channel?
7. Describe the pulmonary circulation, giving changes in blood in same.
8. What is the lymphatic system?
9. How is heat dissipated from the body?
10. What organs eliminate soluble systemic poisons from the body?

VIRGINIA.

CHEMISTRY.

1. Give preparation, properties, and uses of N_2O.
2. Give preparation, properties, and uses of (1) chloroform, (2) iodoform.
3. Name salts of K, and give preparation and medical uses of any two.
4. Give preparation of (1) ether, (2) chloral hydrate.
5. What is the periodic law?
6. Name three organic acids, and give description of two compounds of such acids used in medicine.
7. Name three sorts of sugars.
8. What changes occur in sugar solutions exposed to air?
9. What are the ordinary chemical substances used to produce soap?
10. Name four vegetable active principles used in medicine.
11. Name three mineral acids, with formula for any two.
12. Name following, any two:

(1) $C_2H_4O_2$ (3) $KMnO_4$ (5) C_4H_4O
(2) C_2H_2 (4) $Ca(ClO_3)_2$ (6) HNO_3

MATERIA MEDICA.

1. Define the following terms, giving an example of each: Alteratives, narcotics, diuretics, emmenagogues, mydriatics.
2. Define and classify anesthetics, naming the more prominent of each class, and state which you regard the safest general anesthetic, giving the main reason why you so regard it.
3. Give doses of the following: Hydrochloric acid dilute, hydrocyanic acid dilute, oxalate of cerium, chloral hydrate, codeine sulphate, creosote, strychnia sulphate, tincture strophanthus, and atropia sulphate.
4. Give sources from which cinchona is obtained and mention its main salt and alkaloid.
5. From what is the alkaloid hyoscine obtained, what is the dose and how best administered?
6. Classify astringents, with reference to the sources from which they are obtained and give one or more examples of each class.
7. Name several leading antipyretics and state in general how they reduce temperature.

THERAPEUTICS.

1. Give modes of administering drugs, and a good rule for dosage to children.
2. Give four general indications for diuretics.
3. What three ill effects sometimes develop during administration of digitalis, and what is its best substitute?

4. Write a prescription for four doses, containing four drugs, having active cholagogue properties.
5. Give indications and contraindications for use of ergot.
6. What are the general indications in the treatment of poisoning by drugs?
7. Give symptoms and treatment for poisoning by carbolic acid.
8. Differentiate the coma resulting from opium, uremia and alcohol.

THEORY AND PRACTICE OF MEDICINE.

1. Give treatment and management, in general, of typhoid patient, during and immediately following profuse intestinal hemorrhage.
2. Give period of incubation and symptoms of smallpox.
3. Differentiate lobar from bronchopneumonia.
4. Give symptoms of acute uremia.
5. Give gross pathology of hypertrophic cirrhosis of liver.
6. Give treatment of acute nephritis.
7. Define (*a*) hydronephrosis; (*b*) empyema; (*c*) chlorosis; (*d*) Graves' disease; (*e*) sciatica.
8. Name the important complications of acute articular rheumatism.
9. Name five important symptoms of tabes.
10. Give causes of arteriosclerosis.

OBSTETRICS AND PEDIATRICS.

1. Give relative diameters of inlet and outlet of the true pelvis and fetal skull.
2. Give preparation of patient, solutions, dressings, room and bed during labor.
3. Describe an up-to-date obstetrical bag and its contents.
4. Technique of applying and delivering by forceps a R. O. P. position, the head being through the cervix, but not on the perineum.
5. Course and treatment of (*a*) primary uterine inertia; (*b*) secondary uterine inertia.
6. Causes, symptoms and treatment of phlegmasia alba dolens.
7. Diagnosis and treatment of early hereditary syphilis in infants.
8. Give the handling and care of cow's milk in order to be able to dispense with pasteurization of the same for infant feeding during the summer months.
9. Give clinical manifestations of acute infantile paralysis.
10. Give causes and treatment of acute ileocolitis.

SURGERY.

1. What is surgical shock? How managed?

2. What is the difference between an acute abscess and a purulent infiltration?
3. Describe the appearance, symptoms, and management of a syphilitic leg-ulcer.
4. Differentiate fractures and dislocations.
5. To what are hemorrhoids due? How many forms, and how treated?
6. Differentiate an incarcerated from a strangulated hernia. What other conditions may be mistaken for them?
7. Give detailed description of an amputation at mid-forearm. Include technique (preparatory and operative), describe each step in regular order, until dressing is complete.

GYNECOLOGY.

1. What conditions may produce leucorrhea?
2. To what may dysmenorrhea be due, and how best remedied?
3. To what symptoms would a medium perineal laceration give rise?
4. Differentiate pregnancy, retained menses, and uterine fibroid.
5. What are the evidences and manifestations of approaching puberty?

PATHOLOGY AND BACTERIOLOGY.

1. Define the terms thrombus and embolus, giving the causes and results of each.
2. Explain the occurrence of the metastatic abscesses characteristic of certain infectious diseases.
3. Name the diseases in which intestinal ulceration is an essential feature. Name the portion (or portions) of the intestinal tract in which the ulceration is found in each of these diseases.
4. Describe the phenomena, or signs, of inflammation, illustrating the subject by describing the formation of a common boil (furuncle).
5. Name the variety of degeneration termed cloudy swelling. Name the class of diseases in which it commonly occurs.
6. Name the class of tumors under which the carcinomata are grouped histologically. Name the subvarieties of carcinomata.
7. Give the bacteriology of erysipelas, syphilis, puerperal infections, and basilar meningitis.
8. Explain the mode of infection in the malarial fevers, typhoid fever, tuberculosis, and tetanus.
9. Define the term protozoa. Name two pathogenic protozoa and the disease which each causes.
10. Give a typical example of an obligate parasite, and of

a facultative parasite. Does the colon bacillus ever become parasite in nature?

MEDICAL JURISPRUDENCE.

1. Name six signs of death.
2. How soon after death does rigor mortis set in, and to what is it due?
3. How can you determine that a body has been burned during life or after death?
4. What is infanticide?
5. Define illusion.

TOXICOLOGY.

1. What is the first thing you would do in being called to a case of poisoning?
2. Name two reliable emetics with dosage.
3. Give the best general antidote for (*a*) arsenical preparations; (*b*) mineral acids.
4. Give symptoms of acute phosphorus poisoning.
5. Give treatment of carbonic acid gas poisoning.

HYGIENE AND PREVENTIVE MEDICINE.

1. How does standing water purify itself?
2. Give an efficient method of rendering river water suitable for town consumption.
3. In the disposal of sewage, which is the more effective: the intermittent or the continuous flow, and why?
4. Give a cheap and effective formula for disinfecting privies and water closets.
5. How would you manage an epidemic of scarlet fever, and how would you disinfect clothing and rooms?

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

VIRGINIA STATE BOARD OF MEDICAL EXAMINERS.

ANATOMY.

1. The *spine* is a flexible column composed of the vertebræ superimposed one on the other, and of intervertebral substance. The vertebræ are seven in the cervical region, twelve in the dorsal, five in the lumbar, five in the sacral, and four in the coccygeal. The two last sets unite to make the sacrum and coccyx. It is about twenty-six inches long. Viewed laterally the spine shows four curves, the cervical, dorsal, lumbar, and pelvic; these curves are alternately convex and concave (from before backwards). Through the center of the spine is the spinal canal for the spinal cord. The *general characters of a vertebra* are: Body or centrum, arch, two pedicles, two

laminæ, four articular processes, two transverse processes, and one spinal process.

2. MUSCLES OF THE ORBIT.—*Levator palpebræ superioris. Origin,* from lesser wing of the sphenoid, near the optic foramen; *insertion,* superior border of tarsal cartilage; *action,* elevates the upper eyelid; *nerve,* third cranial, or motor oculi. *Rectus superior. Origin,* sheath of the optic nerve and upper marin of optic foramen; *insertion,* into upper surface of sclerotic coat; *action,* rotates the eyeball upward; *nerve,* third cranial. *Rectus inferior. Origin,* from lower and inferior part of optic foramen (ligament of Zinn); *insertion,* into lower surface of sclerotic; *action,* rotates the eyeball downward; *nerve,* third cranial. *Rectus internus. Origin,* same as rectus inferior; *insertion,* into inner surface of sclerotic; *action,* rotates the eyeball inward; *nerve,* third cranial. *Rectus externus. Origin,* by two heads—lower from ligament of Zinn and lower margin of sphenoidal fissure, upper from outer margin of optic foramen; *insertion,* into outer surface of sclerotic; *nerve,* abducens, or sixth cranial. Passing between the two heads are the opthalmic vein, the third, nasal branch of fifth, and sixth nerves. *Superior oblique. Origin,* from inner margin of optic foramen; its tendon passes through a pulley near the internal angular process of the frontal bone; *insertion,* into sclerotic, between external and superior recti, midway between entrance of optic nerve and the cornea; *action,* rotates the eyeball on its axis; *nerve,* fourth, or patheticus. *Inferior oblique. Origin,* orbital plate of superior maxilla; *insertion,* near that of superior oblique, between external and superior recti; *action,* rotates the eyeball on its axis; *nerve,* third cranial.

3. The *branches of the axillary artery* are: Superior thoracic, acromial thoracic, long thoracic, alar thoracic, subscapular, anterior circumflex, and posterior circumflex. *Relations of third part of axillary artery: In front:* Skin, fascia, pectoralis major, and inner head of median nerve. *Behind:* Subscapularis, latissimus dorsi, teres major, circumflex and musculospiral nerves. *Outer side:* Median and musculocutaneous nerves and coracobrachialis. *Inner side:* Axillary vein, ulnar nerve, and lesser internal cutaneous nerve.

4. The *lymphatic system* consists of lymphatic glands, lymph vessels, perivascular lymph spaces, lymph canalicular system, body cavities, and lacteals.

The *thoracic duct* extends from the second lumbar vertebra, where it commences by a dilatation, the *receptaculum chyli,* to junction of left internal jugular with left subclavian vein. The abdominal part is placed on the front of the body of the second lumbar vertebra, behind

and to the right side of the aorta and on the inner side of the right crus; it then enters the thorax through aortic-opening, on the right side of aorta, lying between it and the vena azygos major, and passes upward to right of aorta on right intercostal vessels. Opposite the fourth dorsal vertebra it passes to the left behind arch, and runs along the left side of the esophagus, behind the left common carotid artery. At the level of the seventh cervical vertebra it turns outward, and, passing behind left internal jugular and crossing first part of left subclavian artery, arches over the apex of the left pleura to open at the angle of union of the left internal jugular and left subclavian veins.—(From *Aids to Anatomy.*)

The *portions of the body drained by it* are: Both lower limbs; abdomen, excent upper surface of the liver; left half of thorax; left side of head and neck, and left upper extremity.

The *right lymphatic duct* receives the absorbents of the right upper limb, right side of chest, right half of head and neck, and upper surface of liver. It is about half inch long, and enters the venous system at the angle of union of the right internal jugular and right subclavian veins.

5. The regions of the abdomen and their contents are shown in the following table. It is to be remembered that the contents will vary according to the position of the lines drawn; these are arbitrary, and nearly every writer differs from every other. In the following table the superior horizontal line extends between the cartilaginous ends of the tenth ribs, the inferior between the anterior superior iliac spines. The vertical lines pass upward from the iliopectineal eminences, at right angles to the upper horizontal line.

The viscera situated in each region are as follows:

RIGHT HYPOCHONDRIAC.	EPIGASTRIC.	LEFT HYPOCHONDRIAC.
Liver.	Liver.	Stomach.
Right Kidney.	Stomach.	Spleen.
Hepatic flexure of the colon.	Gall-bladder.	Left kidney.
	Duodenum.	Splenic flexure of the colon.
	Pancreas.	
RIGHT LUMBAR.	**UMBILICAL.**	**LEFT LUMBAR.**
Right kidney.	Transverse colon.	Small part of left kidney.
Ascending colon.	Duodenum and small intestines.	Descending colon.
Ileum.	Great omentum.	Small intestines.

RIGHT ILIAC.	HYPOGASTRIC.	LEFT ILIAC.
Cetum.	Small intestines.	Sigmoid colon.
Appendix.	Bladder in children.	Small intestines
Last coil of ileum.	Distended bladder in adults.	
	Pregnant uterus.	
	Sigmoid colon.	

6. *Superior radio-ulnar articulation* is a pivot joint, formed by the head of the radius rotating within the lesser sigmoid cavity of the ulna. Its only ligament is the orbicular or annular.

HISTOLOGY.

1. The *elementary tissues of the body* are: Epithelial, connective, muscle, and nerve. They are all made up of cells and intercellular substance.

A typical cell is the ultimate element of structure; it enters into the formation of all tissues. It consists of a tiny mass of protoplasm, and contains a nucleus and an attraction sphere, but as a rule no cell wall. Cells vary in shape and size (from about 1-3000 to 1-300 of an inch in diameter), and are characterized by power of movement, assimilation, growth, excretion, and reproduction.

2. *Varieties of muscle tissue:* (1) Voluntary striated muscle; (2) involuntary, non-striated muscle; (3) involuntary striated or cardiac muscle. (1) is found in skeletal muscles, pharynx, diaphragm, larynx, external ear and eye. (2) is found in the alimentary tract, trachea, bronchi, arteries, ureter, bladder, uterus. (3) is found in the heart.

3. *Nerve fibers and nerve cells.* Nerve cells are of different sizes and varying shape; some are ovoid, some irregular in outline. Each cell has a large, distinct, spheroidal nucleus with a single nucleolus and fibrillated protoplasm. Nissl's granules are sometimes found in the protoplasm. From the cells are given off axis cylinder processes or *neuraxes*, and protoplasmic processes or *dendrites*. These are the principal elements in nerve fibers. Every nerve cell has an axis cylinder process, which in the medullated nerve fiber becomes the axis cylinder, and in the non-medullated is the nerve fiber itself. The function of the nerve cell is to receive, or to send out, or to modify, nerve impulses; the function of the nerve fiber is to carry nerve impulses.

4. The *stomach* possesses four coats: (1)) The *serous*, or reflection of the peritoneum; (2) the *muscular*, the fibers of which are arranged in a longitudinal, a circular, and an oblique direction. At the pyloric end the circular

fibers increase in number and form a thick ring or band, which is known as the sphincter of the pylorus; (3) the *submucous,* consisting of a layer of connective tissue; (4) the *mucous,* which is somewhat larger than the muscular coat, and in consequence is thrown into folds or rugæ. The surface of the mucous coat is covered by tall, narrow, columnar epithelium.

EMBRYOLOGY.

1. At an early stage the fetus contains an indifferent sexual gland, together with duct of Muller and the Wolffian duct. Later the gland becomes either testis or ovary; and in the male, the duct of Muller atrophies, and disappears (except at its extremities); while in the female the Wolffian duct atrophies or degenerates.

2. In the *human ovum* the protoplasm and deutoplasm are uniformly distributed; in the *ovum of the fowl* the deutoplasm accumulates to one side of the ovum.

PHYSIOLOGY.

1. *Distribution of vagus:* To dura, external ear, pharynx, larynx, heart, lungs, esophagus, and stomach. *Functions:* "Throughout its whole course the vagus contains both sensory and motor fibers. To summarize the many functions of this nerve . . . it may be said that it supplies (1) *motor* influence to the pharynx and esophagus, stomach, and intestines, to the larynx, trachea, bronchi, and lungs: (2) *sensory* and, in part, (3) *vasomotor* influence, to the same regions; (4) *inhibitory* influence to the *heart;* (5) *inhibitory* afferent impulses to the *vasomotor center;* (6) *excito-secretory* to the salivary glands; (7) *excito-motor* in coughing, vomiting, etc." (Kirkes' *Physiology.*)

2. An *efferent impulse* is one that is conveyed away from the nerve centers; an *afferent impulse* is one that is conveyed toward the nerve centers. A *reflex act* is an involuntary or unconscious act due to a suitable stimulus. It depends upon the integrity of the *reflex arc,* which is a complex made up of (1) A surface capable of receiving an impression; (2) an efferent nerve; (3) a nerve cell capable of receiving and also of sending out impulses; (4) an efferent nerve, and (5) a surface capable of responding in some way to the impulse conveyed by the efferent nerve.

3. *Parotid gland* is situated on the side of the face below and in front of the ear; it communicates with the mouth by Stenson's duct. *Submaxillary gland* is situated below the mandible, in the submaxillary triangle; it communicates with the mouth by Wharton's duct. *Sublingual gland* is in the floor of the mouth, at the side of the frenum of the tongue; it communicates with the mouth by the ducts of Rivinus.

4. Saliva by the ptyalin, aids in digestion of starches; the ptyalin converts them into dextrin and sugar.

5. *Bile* is composed of water and solids; these latter are sodium glycocholate, sodium taurocholate, mucin and pigments, cholesterin, lecithin, fats, salts (both soluble and insoluble).

The *functions of the bile* are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis; and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach, and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action.

6. The blood passes through arteries, capillaries and veins. The changes occur in the capillaries, where the blood gives up nourishing material to the tissues and receives from them waste matter; in this way the blood is changed in character from arterial to venous.

7. For pulmonary circulation, see Cunningham's "Anatomy" (1909), page 991; or Gray's "Anatomy" (1908), page 1404.

(*b*) In its passage through the lungs, the blood in the pulmonary artery: (1) becomes cooled; 2; becomes a brighter red color; (3) gains oxygen (about 10 or 12 volumes); (4) loses carbon dioxide (about 7 volumes).

8. See above, ANATOMY, question 4.

9. *Heat is given off from the body* by: (1) The skin, through evaporation, radiation, and conduction; (2) the expired air; (3) the excretions—urine and feces.

10. The liver, lungs, kidneys, skin, and intestines.

CHEMISTRY.

1. PREPARATION OF N_2O. By heating ammonium nitrate:

$$NH_4NO_3 + \text{heat} = 2H_2O + N_2O.$$

Properties: It is a colorless, odorless gas, with a sweetish taste, heavier than air, slightly soluble in water, is a supporter of combustion. It has (when inhaled) anesthetic properties. *Uses:* As an anesthetic, chiefly for short operations.

2. CHLOROFORM. *Preparation:* By heating chloral hydrate with potassium hydroxide:

$$C_2HCl_3(OH)_2 + KOH = HCOOK + H_2O + CHCl_3.$$

Properties: It is a colorless, volatile liquid, with a sweetish taste and a strong, peculiar odor. It is a good solvent for many substances not soluble in water. *Uses:* As an anesthetic and a solvent.

IODOFORM. *Preparation:* By heating alcohol, iodine, and potassium bicarbonate:

$$C_2H_5OH + 2I_2 + 2KHCO_3 = 2KI + 3H_2O + 2CO_2 + 2CHI_3.$$

Properties: A yellow, crystalline solid with a peculiar penetrating odor; insoluble in water. It contains nearly 97 per cent of iodine. *Uses:* Treatment of wounds, sores, and ulcers; as a surgical dressing.

3. *Salts of K:* Chloride, bromide, iodide, nitrate, hypochlorite, chlorate, sulphates, dichromate, permanganate, acetate, carbonates, oxalate, tartrates, cyanide, ferrocyanide, ferricyanide:

POTASSIUM IODIDE is *made* by dissolving iodine in solution of potassium hydroxide.

$$3I_2 + 6KOH = KIO_3 + 3H_2O + 5KI.$$

Medical uses: In syphilis, rheumatism, pleurisy, synovitis, arteriosclerosis, nephritis, lead and mercury poisoning, goiter.

POTASSIUM ACETATE is *made* by treating acetic acid with potassium carbonate:

$$2C_2H_4O_2 + K_2CO_3 = CO_2 + H_2O + 2KC_2H_3O_2$$

Medical uses: As a diuretic, diaphoretic, in rheumatism, gravel, irritation of the urinary tract, and in fevers generally.

4. *Ether* is prepared by the action of sulphuric acid on alcohol:

$$C_2H_5OH + H_2SO_4 = H_2O + C_2H_5HSO_4$$
$$C_2H_5HSO_4 + C_2H_5OH = H_2SO_4 + (C_2H_5)_2O.$$

Chloral hydrate is prepared by the action of water on chloral:

$$CCl_3.CHO + H_2O = CCl_3.CH(OH)_2.$$

5. The periodic law of Mendelejeff states that "The properties of elements, the constitution of their compounds, and the properties of these latter are periodic functions of the atomic weights of the elements."

6. *Three organic acids:* Oxalic, tartaric, and citric acids.

Cerium oxalate is a white granular powder, odorless and tasteless, insoluble in water.

Lithium citrate is an odorless, white powder or colorless crystalline substance, deliquescent.

7. *Three sorts of sugars:* Monosaccharids, disaccharids, and trisaccharids.

8. Fermentation occurs.

9. Soaps are generally the sodium, or potassium salt of oleic, palmitic, or stearic acid.

10. Strychnine, morphine, aconitine, and digitalin.

11. Hydrochloric acid, HCl; sulphuric acid H_2SO_4; nitric acid, HNO_3.

acid.

12. (1) Acetic acid; (2) acetylene; (3) potassium permanganate; (4) calcium chlorate; (5) phenol; (6) nitric

MATERIA MEDICA.

1. *Alteratives* are substances which in some unknown way modify the course of disease; *Ex.* mercury.

Narcotics are agents which produce, or tend to produce, deep sleep, and to relieve pain; *Ex.* opium.

Diuretics are agents which promote the secretion of urine; *Ex.* alcohol.

Emmenagogues are agents which promote the menstrual flow; *Ex.* apiol.

Mydriatics are agents which cause the pupil of the eye to dilate; *Ex.* atropine.

2. *Anesthetics* are agents which temporarily abolish sensation. *Local anesthesia* is the condition in which there is loss of sensibility of the tissues over a limited area, due to the application of certain agents, such as cold, ethylene chloride, ether, cocaine, eucaine, or the infiltration of water, or a solution of salt, or of salt, cocaine, and morphine. *General anesthesia* is a condition in which there is unconsciousness as well as abolition of sensation; it may be induced by the inhalation of ether, chloroform, nitrous oxide gas, chloride of ethyl, or a combination of certain of these agents. The safest general anesthetic is nitrous oxide; the mortality with this anesthetic is very much less than that with the other general anesthetics.

3. Dilute hydrochloric acid, ℥x-xx; dilute hydrocyanic acid, ℥ij-v; oxalate of cerium, gr. v; chloral hydrate, gr. x-xv; codeine sulphate, gr. j; creosote, ℥j-iij; strychnine sulphate, gr. 1/40; tincture strophanthus, ℥v; atropine sulphate, gr. 1/80.

4. Cinchona is obtained from several varieties of cinchona tree (cinchona calisaya, ledgeriana, officinalis, succirubra, condaminea, pitayensis, micrantha). Its main alkaloid is quinine; its chief salt the sulphate.

5. Hyoscine is an alkaloid of hyoscyamus; the dose of hyoscine hydrobromide is gr. 1/125; best given hypodermically.

6. *Astringents are:* (1) *Vegetable* (as tannic acid, catechu, rhus glabra); and (2) *Mineral* (as alum, lead, silver nitrate).

7. The following table (from Potter's "Materia Medica") gives the chief antipyretics with their manner of action. Temperature depression may be done by five different actions working upon two principal lines, viz., by—

(*a*) *Lessening heat production, by*
- (1) diminishing tissue change.
- (2) reducing the circulation.

(*b*) *Promoting heat loss, by*
- (3) dilating cutaneous vessels, thus increasing heat radiation.
- (4) promoting perspiration—its evaporation lowering the temperature.
- (5) abstracting heat from the body.

The following list of antipyretics includes a few for each of the above-named actions, to which the numbers refer in each case, viz.:

Quinine, 1.	Aconite, 2.	Antipyrin, 1, 4.
Phenol, 1.	Alcohol, 1, 3.	Antimony, 2, 4.
Salicin, 1.	Nitrous ether, 3, 4.	Cold bath, 5.
Digitalis, 2.	Acetanilid, 1, 4.	Cold drinks, 5.
	Phenacetin, 1, 4.	Wet-pack, 5.

THERAPEUTICS.

1. *Medicine can be administered:* (1) By the mouth; (2) by the rectum; (3) by inhalation; (4) by inunction; (5) hypodermically; (6) by intravenous injection; (7) by fumigation; (8) by cataphoresis.

To determine the proper dosage for a child: Let $x =$ the age of a patient; then $\frac{x}{x+12} =$ the fraction of the adult dose which the patient should receive. Thus, a patient of four years old should receive $\frac{4}{4+12} = \frac{4}{16} = \frac{1}{4}$ of an adult dose.

2. Diuretics are employed: (1) To remove excess of fluid from the tissues, as in dropsy; (2) to dilute the urine; (3) to promote the elimination of waste products or poisonous material from the blood, and (4) to maintain the action of the kidneys.

3. *Three ill effects:* Nausea, indigestion, and syncope. The best substitute is strophanthus.

4. ℞. Extracti colocynthidis, gr. j.
Hydrargyri chloridi mitis, gr. viij.
Jalapæ resinæ, gr. iv.
Extracti colchici, gr. ij. Misce.
Fiat massa in pilulas no. iv. dividenda.
Signa: Take one at bedtime.

5. ERGOT. *Indications:*—To promote uterine contractions during third stage of labor; fibroids, menorrhagia, post-partum hemorrhage. Some forms of amenorrhea and dysmenorrhea, dysentery, arterial hemorrhage, congestive headaches, laxity of sphincters of bladder or rectum, hem-

orrhoids, aneurysm, diabetes, urinary incontinence, direct paralysis of the sphincter vesicæ, atonic spermatorrhea.

Contraindications:—In labor if the birth canal is not free, and the os uteri is not dilated.

6. *General principles of treatment in poisoning:* "(1) Lose no time. (2) Use the best remedy obtainable at once. (3) Get rid of the poison. (4) Stop its action. (5) Remedy the mischief already done. (6) Fight against the tendency to death (Tanner). In the treatment of poisoning, whether by mineral or vegetable substances, if the poison is known the first indication is to administer the proper chemical *antidote,* so as to render it harmless or comparatively so. Next, the stomach should be emptied and washed out, lest the newly formed compound be absorbed after a time, also to remove any poison which may have escaped the action of the antidote. Next, the appropriate *antagonist* should be administered to counteract the effects of such portion of the poison as may have been absorbed. Lastly, such *antagonistic measures* should be employed as may sustain the action of any organic function showing signs of failure. In most cases of alkaloid poisoning absorption has proceeded so far before professional assistance is obtained that antidotes are of no value, hence reliance can be placed only upon the physiological antagonist and such supporting measures as will tend to maintain vitality until the poison can be eliminated by the natural channels."—(Potter's *Materia Medica,* etc.)

7. *Symptoms of carbolic acid poisoning:* Buccal mucous membrane is whitened and hardened; vomiting; burning pain in mouth, esophagus, and stomach; pulse and body temperature are lowered; the pupils are contracted; collapse, and finally death. The urine may become dark.

The *treatment* consists in administering white of egg, sodium sulphate, or saccharated lime, followed by lavage. Alcohol is said to be antidotal.

8.

UREMIC COMA.	ALCOHOLIC COMA.	OPIUM POISONING.
Deep coma. Slow onset unless convulsions have preceded the coma.	Can be aroused by supraorbital pressure unless very profound.	Can be aroused unless very deep.
Albuminuric retinitis.	Pupils normal or somewhat dilated.	Pupils contracted to pinpoint size.
Pulse rapid.	Pulse more rapid than normal and full.	Pulse rapid, may be irregular.

UREMIC COMA.	ALCOHOLIC COMA.	OPIUM POISONING.
Respiration frequent and irregular.	Regular respiration.	Respiration very slow—may be 6 to 8 per minute.
Urine shows albumin, casts, and low urea percentage.	Normal.	Normal.

—(From Eisendrath's *Surgical Diagnosis.*)

THEORY AND PRACTICE OF MEDICINE.

1. *Intestinal hemorrhage* indicates absolute rest and suspension of cold bathing. The foot of the bed should be slightly elevated and an ice-bag placed over the right iliac region. Morphine (3¼) should be given hypodermically at once. Fluid extract of ergot, f℥i (4 c.c.), Monsel's solution, ♏v to x (0.3 to 0.6 gm.) or oil of turpentine, ♏v (0.6 c.c.), should be administered every two hours. The quantity of food should be reduced to the minimum and in some cases feeding should be suspended for twelve hours or more.

2. Period of incubation is from seven to fifteen days. Symptoms are: Sudden onset, violent chill, vomiting, severe headache, pains in back and limbs, fever to about 103° F., rapid pulse, injected conjunctivæ, prostration, and characteristic eruption. The eruption usually appears first on the forehead and wrists, and on the third or fourth day; it is first macular, then papular, then vesicular, and finally pustular; it does not appear in successive crops; the spots are multilocular, and do not collapse on being punctured; the papule is hard and shotty, and does not disappear on stretching the skin.

3. LOBAR PNEUMONIA	BRONCHOPNEUMONIA
Generally a primary disease.	Generally secondary (to bronchitis or an infectious disease).
Age has little influence.	Generally found in very young or very old.
Sudden onset.	Gradual onset.
Fever is high and regular.	Fever is not so high, and is irregular.
Ends by crisis between sixth and tenth day.	Ends by lysis, at no particular date.
Generally only one lung affected.	Generally both lungs affected.
The physical signs are distinct, and there is a large area of consolidation.	Physical signs indistinct, and the evidences of consolidation are indefinite.
Sputum is rusty.	Sputum is rather streaked with blood.

4. *In acute uremia* are found headache, nausea, vertigo, may be convulsions, coma, and amaurosis. Constipation, scanty urine (which may be albuminous), and Cheyne-Stokes respiration are also present.

5. In *hypertrophic cirrhosis*, the liver is yellowish in color and remains enormously enlarged throughout its entire course. The newly-formed connective tissue shows very little tendency toward contraction or toward compression of any of the branches of the portal vein. The connective tissue is developed to a greater extent within the lobules and thus produces obstruction of the biliary channels and consequent jaundice.

6. Rest in bed, warmth, heat over loins, salines, alkaline waters to drink, milk, and non-nitrogenous diet.

7. *Hydronephrosis* is dilation of pelvis and calyces of the kidney, due to obstruction to the flow of urine.

Empyema is a collection of pus in the pleural cavity.

Chlorosis is a form of anemia characterized by a diminution in the amount of hemoglobin.

Graves' disease is exophthalmic goiter; characterized by goitre, exophthalmos, tachycardia, palpitation, and tremors.

Sciatica is a neuralgia of the sciatic nerve.

8. Hyperpyrexia, delirium, endocarditis, pericarditis, myocarditis, bronchitis, tonsilitis, pharyngitis, pleurisy, bronchopneumonia, chorea, meningitis, iritis.

9. *Five important symptoms of tabes:* Loss of patellar reflex, lightning pains, Argyll-Robertson pupil, incoordination, and loss of muscular sense.

10. Age, male sex, excessive eating of meat, alcohol, syphilis, uric acid, gout, rheumatism, lead poisoning, nephritis, tuberculosis.

OBSTETRICS AND PEDIATRICS.

1. The pelvic diameters:

	Antero-posterior.	Oblique.	Transverse.
Inlet	4 inches.	4½ inches.	5 inches.
Outlet	5 inches.	4½ inches.	4 inches.

The fetal head has the following diameters: Occipito-frontal, occipito-mental, bitemporal, biparietal, suboccipito-bregmatic, trachelo-bregmatic, and mento-bregmatic. Of these, the occipito-frontal is 4½ inches, the occipito-mental is 5½ inches, and all the others are approximately 3½ inches.

2. The *patient,* at the beginning of labor takes a tepid bath and is well scrubbed all over with soap and water. Then an enema of soap and water to empty the bowel; after the action of which, the external genitals, thighs, buttocks, and abdomen are carefully washed with a 1:2000 bichcloride solution, special attention being given to overlook no fold or fissure of the surface. The vaginal douche,

of 2 per cent. creolin solution, or the weak solution of bichloride of mercury formerly used before labor, has been abandoned, unless there be some already existing infection, when it may be used. The normal vaginal mucus is itself germicidal in some degree, as well as a useful lubricant, and should therefore be allowed to remain undisturbed. Moreover, washing out the vagina exposes the woman to some danger of infection from an unclean syringe. The *physician*, before making any examination or doing any operation, removes his coat, bares the arms to above the elbows, when the hands and arms are thoroughly scrubbed with soap, water, and a stiff nail-brush. Scrape the under surface of the nail-ends and the fissures surrounding the nails with some pointed instrument, not sharp enough to scratch, and having washed off all soap in some clean water, immerse the hands and leave the arms in a 1:2000 bichloride solution, and continue this last washing for ten minutes." (King's *Obstetrics.)*

3. The contents of the obstetrical bag will vary with the requirements and experience of its owner, and the preparations already made by the patient. In any case the following articles should be taken by the accoucheur to a confinement: Tablets of bichloride of mercury, or some other material for making antiseptic solution; forceps; ether or chloroform, with inhaler or mask; fluid extract of ergot; hypodermic syringe, with tablets of strychnine, morphine, etc.; needles, sutures, and needle holder; nail brush and nail cleaner; umbilical scissors; carbolized vaseline; stethoscope; male catheter (rubber); a 1 per cent. solution of nitrate of silver, with eye dropper.

In addition to the above some would also include: A sterile apron or suit; a Kelly pad; solution of cocaine; soap, boric acid, and gauze, all sterilized; absorbent cotton, iodoform gauze, chloral hydrate; dilators, and other instruments.

A bag or grip made of canvas, or a metal case covered with canvas, is better than a leather bag, as the former can be sterilized.

4. "The blades are put in exactly as for cases where the occiput has rotated anteriorly. But since the occiput is now toward the sacrum, the *extension will, of course, be downward and backward over the perineum*, instead of upward toward the pubes; hence the handles of the instrument, at first lifted somewhat upward toward the pubes to draw the occiput up to the edge of the perineum, must, when the head emerges, be directed *downward and backward*, instead of toward the *mons veneris*.. A moment's reflection will show that the short *straight* forceps (without any sacral curve) should be used in these cases; for the said curve is only adapted to follow the axis of the

pelvic canal, but during *backward* extension of the occiput over the perineum the head departs from the axial line and goes in an almost opposite direction. If the *curved* forceps were used, the ends of the blades would impinge against the pubic arch while the handles were being depressed in following the movement of backward extension. Again, owing to the depth of the posterior pelvic wall being three times as great as that of the anterior one, there is so much the more difficulty in getting the occipital end of the occipitomental diameter to escape over the edge of the perineum, hence greater danger of laceration, and necessity for extra care that the occipital pole *really* shall have cleared the perineum before extension is attempted."—(King's Obstetrics.)

5. Uterine inertia is *primary*, when it is simply characterized by weak pains from the beginning. In *secondary* inertia the labor has begun in a normal way, but pains have given out, and there is a condition of uterine exhaustion. Primary inertia requires rest, strychnine, and (some say) ergot; secondary inertia needs sleep, chloral, bromids, and opium. In the primary form version or artificial delivery may be indicated.

6. PHLEGMASIA ALBA DOLENS. *Causes:* Sepsis, phlebitis, and thrombosis. *Symptoms:* Irregular chilliness and malaise, pain in leg and abdomen, rigor and swelling of leg, fever, skin is white and tense, and the vein feels hard. *Treatment:* Rest in bed, support patient's strength, relieve pain, and apply lead and opium wash to take down the inflammation.

7. *Hereditary syphilis:* Supposing the child to have been born alive, it usually shows no evidence of disease for a period ranging between two and six weeks, sometimes longer, after birth. It then, as a rule, gradually loses its healthy appearance, begins to snuffle, becomes fretful, and wastes more or less rapidly. The child's skin assumes a dull, dirty color, and, though loose and wrinkled, is very brittle and easily breaks round the mouth and nose into chaps and fissures, the scars of which often form a characteristic sign in after life, if the child survive. *Treatment:* In the case of a syphilitic child, whether the disease has been acquired or inherited, mercurial treatment should always be adopted as soon as symptoms appear. Gray powder may be given in one-grain doses twice a day; or a strip of flannel smeared with diluted mercurial ointment may be worn round the waist. The ointment should be renewed every night, and the skin cleansed every third day. Some preparations of iron and codliver oil are also often useful. Iodide of potassium may also be given.

8. *Essentials for the production and preservation of pure dairy milk:* Vaughan's rules are as follows: "(1) The

cows should be healthy, and the milk of any animal which seems indisposed should not be mixed with that from the healthy animals. (2) Cows must not be fed upon swill or the refuse from breweries or glucose factories, or upon any other fermented food. (3) Milch cows must not be allowed to drink from stagnant pools, but must have access to fresh, pure water. (4) The pasture must be freed from noxious weeds, and the barn and yard must be kept clean. (5) The udders should be washed and then wiped dry before each milking. (6) The milk must be at once thoroughly cooled. This is best done in the summer by placing the milk can in a tank of cold water or ice water, the water being of the same depth as the milk in the can. It would be well if the water in the tank could be kept flowing, and this will be necessary unless ice water is used. The tank should be thoroughly cleaned each day to prevent bad odors. The can should remain uncovered during the cooling, and the milk should be gently stirred. The temperature should be reduced to 60° F., or lower, within an hour. The can should remain in cold water till ready for delivery. (7) Milk should be delivered during the summer in refrigerated cars or in bottles about which ice is packed during transportation. (8) when received by the consumer it must be kept in a clean place, and at a temperature some degrees below 60° F."

9. *Acute infantile paralysis:* "The onset of the affection varies; it may be acute, subacute, or chronic; it is usually sudden, with an attack of mild fever of a remittent type, of a few days' duration, on recovery from which it is noticed that the child is paralyzed. Rarely the paralysis may be preceded by convulsions. The paralysis may affect both arms and both legs, the legs alone, or only one of the four extermities; it may, very rarely, be a hemiplegia. As a rule, however, the leg suffers more frequently than the arm; in paralysis of the leg the muscles below the knee suffer more severely than those above. The bladder and rectum are not affected, or, if so, only temporarily, and anesthesia or numbness cannot be detected. The temperature of the paralyzed limb is low and the part is cyanosed in appearance. After a few days there is a slight improvement in the paralyzed parts, although the muscles show a rapid wasting, which is progressive until all muscular tissue is gone. The reflex movements are impaired or abolished. The electro-contractility by the faradic current is abolished in the paralyzed parts. With the galvanic or constant current the 'reactions of degeneration' are developed."—(Hughes' *Practice of Medicine.*)

10. Ileocolitis. *Causes:* Improper feeding, hot weather, bad hygiene, exposure, lowered vitality, inflammation of

some part of the gastro-intestinal tract. *Treatment:* "Hygiene should be improved and exposure prevented. Feeding should be corrected. Cleanliness is imperative. Woolen clothing should be worn next to the skin when there is susceptibility to changes in the atmosphere. During the attack, all food should be withheld for from 12 to 36 hours, and the child placed in bed. The thirst may be quenched by water, ice, barley water, etc. If the child is weak, brandy (gtt. 10-15) may be given. For the abdominal pain, warm baths, turpentine stupes, spice poultice, and mustard plaster, may be necessary. When food is given again, it must be weak and in small quantities. The alimentary canal should be cleared of all irritating material by syrup of ipecacuanha, 3i, if the stomach contains food, or by castor oil, equal parts of castor oil and aromatic syrup of rhubarb, 3i, every hour until free bowel movement, or calomel, gr. ½, with soda bicarbonate, gr. i. for four or five doses. The colon should be irrigated once or twice daily. If movement is not marked in from 24 to 36 hours, intestinal antiseptics, astringents, or both, may be administered."—(Gould and Pyle's *Pocket Cyclopedia.*)

SURGERY.

1. Shock is the name given to a sudden and general depression of the vital powers due to some strong stimulation (such as injury or emotion) acting on the vital centers in the medulla, and producing vasomotor paralysis.

Treatment of shock: place the patient in the recumbent position, with the head low, apply warmth to the body, administer a stimulant, and give a hot saline infusion; morphine, hypodermatically, may be necessary for the relief of pain.

2. In the abscess the pus is circumscribed; in the purulent infiltration it is diffuse and not circumscribed.

3. *A syphilitic ulcer* may be the result of ulceration of a primary sore or chancre, of a secondary pustular or tubercular syphilide, or of a tertiary gumma. The superficial ulcers are usually circular or annular in outline, and by the fusion of several circular ulcers into one the margin is crescentic, and the spreading, with a convex outline, gives rise to the term "serpiginous." The base of a superficial ulcer is dusky red, with sharply cut edges; that of a deeper gummatous ulcer is excavated with overhanging edges, and is at first covered with a yellow, wet, wash-leather-like slough. The discharge may be dry on the surface into an ecthymatous scab, and this may become elevated by fresh layers forming beneath until the scab comes to resemble a limpet shell, and is termed rupia. The cicatrices left have an angular or crescentic outline, are depressed and composed of white fibrous tissue, which

becomes more or less pigmented, especially in dark people.—(Walsham's *Surgery.*)

Treatment: Iodide of potassium internally, with tonics. Locally, a poultice to remove scab or slough, then lotio nigra, or red oxide of mercury, ointment.

4.

FRACTURE.	DISLOCATION.
1. Crepitus may be present.	1. Crepitus never present.
2. Preternatural mobility.	2. Rigidity rather than mobility.
3. Easily reduced—but	3. Difficult to reduce—but
4. Deformity more liable to recur after reduction.	4. Deformity less liable to recur after reduction.
5. The head of the bone is in its proper place.	5. The head of the bone is not in its proper place.
6. The socket containing the head of the bone is not empty.	6. The socket which should contain the head of the bone is empty.
7. When rotated the bone does not move as one piece.	7. When rotated the bone moves as one piece.

5. Hemorrhoids are due to dilation of hemorrhoidal veins, pressure, constipation, pregnancy, pelvic and abdominal tumors, stricture of rectum, cirrhosis of liver. *Varieties:* Internal and external.

The *Treatment* of *external piles* when uninflamed consists in preventing constipation, keeping the parts clean, and applying hamamelis ointment. They seldom need removal, except when associated with internal piles. Inflamed piles should be treated by rest, a large warm enema, and fomentations. If there is much pain, the pile should be incised and the blood-clot turned out.

The *Treatment* of *internal piles:* Constipation must be avoided, also excesses in eating and drinking. The parts must be carefully cleansed, and hamamelis ointment applied. Operations include clamp and cautery, ligature, and Whitehead's operation.

6.

	STRANGULATED COMPLETE HERNIA.	OBSTRUCTED OR INCARCERATED HERNIA.
Swelling	Larger than before and firmer.	Larger than before.
Impulse	None.	Present on coughing, but less marked.
Reducibility	Irreducible.	Irreducible.
Other local signs	Dull pain over swelling, later signs of peritonitis.	

	STRANGULATED COMPLETE HERNIA.	OBSTRUCTED OR INCARCERATED HERNIA.
Signs of obstruction	Colicky pains, absolute constipation; vomiting; later fecal.	Gradual onset; vomiting slight; bowels can be moved. Occurs in aged.
General disturbances	Marked and early intoxication.	Slight, no collapse.

—(From Eisendrath's *Surgical Diagnosis.*)

Reducible, simple, irreducible, or inflamed hernia, tumor or hydrocele may be mistaken for them.

7. *Amputation through middle third of forearm.*—"An anterior and a posterior U-shaped flap are incised on the respective aspects of the forearm, the base of each flap at the saw-line being equal to a half-circumference of the limb at that line, and the length of each equal to three-fourths of the diameter—the hand being supinated in making the anterior flap, and the forearm vertical in making the posterior flap. Having cut through skin and fascia in outlining the flaps, these incisions are now deepened upon the line of the retracted skin, beginning at the ulnar side of the anterior flap, in case of the right arm (and on the radial side upon the opposite arm). The vertical ulnar incision will involve the flexor carpi ulnaris and flexor profundus—the vertical radial incision will involve the two radial carpal extensors—both vertical incisions passing directly to the bones. The muscles on the anterior and posterior aspects of the forearm, at the lower rounded extremities of the flaps, are cut from without inward in such a manner as to bevel them slightly. The entire flaps are now raised from the bones up to a point sufficiently below the saw-line to furnish a musculoperiosteal covering—at which level the periosteum is circularly divided around the bones—the interosseous membrane cut transversely—and the musculoperiosteal covering freed to the saw-line. The soft parts are then retracted and the bones sawed. The radial, ulnar, anterior and posterior interosseous arteries are tied. The median, radial, and ulnar nerves should be cut short, or even dissected from the flap. The musculoperiosteal covering is sutured and the muscles quilted—and the integuments sutured in a lateral line." (Bickham's *Operative Surgery.)*

GYNECOLOGY.

1. ***Leucorrhea may be produced by:*** Pelvic congestion, endometritis, retroversion of uterus, vulvitis, vaginitis, gonorrhea, benign and malignant growths.

2. DYSMENORRHEA. *Causes:* Pelvic congestion, pelvic

inflammation, malnutrition, overwork, lack of development, neuralgia, stenosis, or obstruction of the cervix, prolapse, or displacement of the uterus. *Treatment:* If possible remove cause; attend to the general condition, hygiene, tonics, regular habits, etc.; curettage may be necessary, and may have to be repeated (perhaps more than once).

3. Hemorrhoids, cystocele, rectocele, bearing down pain, frequent urination.

4. *Differential diagnosis.—Pregnancy:* The tumor is hard and does not fluctuate, is situated in the median line, and may give fetal heart sounds and movements; the cervix is soft, and the other signs of pregnancy are present. The rate of growth of the tumor, and the general condition of the patient's health may also help in arriving at a diagnosis.

Retained menses: Absence of other signs of pregnancy, cramp-like pains about once a month; the condition may be of longer duration than an early pregnancy, and the cause of the retained menses is generally demonstrable.

Uterine fibroid: Menstruation is irregular and sometimes very profuse; absence of the signs of pregnancy; the tumor is nodular, firm, irregular in outline, and while generally placed somewhat centrally is not in the median line, and is not symmetrical; the rate of growth is irregular, being, as a rule, slow, and sometimes extending over years.

5. Development of the reproductive organs, enlargement of the breasts, hair on pubis and axilla; the form becomes rounded, the hips widen, menstruation occurs; there are certain mental and emotional changes, and "the development of those womanly beauties physiologically designed to attract the male."

PATHOLOGY AND BACTERIOLOGY.

1. A THROMBUS is a blood clot formed in the blood-vessels during life. *Causes:* Changes in the blood current; changes in the vessel wall; anything within the blood current not covered with endothelium. Generally more than one of these conditions are present. *Results:* Formation of emboli; infarction; heart clot, and sudden death; cerebral softening; the thrombi may become organized, liquefy, soften, become calcified, putrefy, become discolored, or may resolve.

An EMBOLUS is a plug in the circulation. *Causes:* Thrombi, detached pieces from the heart valves, microorganisms, oil, fat, parasites, pieces of new growths. *Results:* Obstruction to the circulation; infarction, inflammation of blood-vessel; dilatation of blood-vessel.

2. Small pieces of infected tissue are carried by the blood or lymph to distant parts; there they are lodged in the capillaries and proliferate and establish metastasis.

3. *Intestinal ulceration* is found: In the duodenum, in burns, in chronic nephritis and in enteritis; in the *ileum,* in typhoid and tuberculous enteritis; in the *large intestine,* in enteritis and dysentery.

4. The phenomena of inflammation are dilatation of the arterioles, capillaries, and small veins. At first the blood-current is quickened, then retardation occurs, and may progress to stasis and thrombosis. During this time exudation of plasma and white corpuscles from the small veins, and perhaps the capillaries, is going on. The fate of the white cell may be either to break up and set free prothrombin, or to act as food for connective-tissue cells, or to act as a phagocyte and be transformed into a pus corpuscle. Red corpuscles may be exuded and broken up, setting free their coloring matter. The prothrombin of the white cells unites with the calcium chloride of the plasma, and forms thrombin, or fibrin ferment, which acts upon the fibrinogen of plasma to form fibrin.

"When inflammation, after reaching the stage of exudation of plasma and leucocytes, goes on to liquefaction of the tissues, the process is called suppuration. Pus is a fluid containing in suspension living and dead leucocytes. Suppuration may occur in the tissues or on a free surface. In the tissues it may be circumscribed by a definite wall of granulation tissue, and is called an abscess; or diffused among the cellular tissues with no limiting wall, then called diffuse cellulitis."—(*Aids to Surgery.*)

5. Cloudy swelling is known as parenchymatous or granular degeneration, also as albuminous infiltration. It commonly occurs in fevers, toxic infections, and some poisonings (such as phosphorus, arsenic).

6. Histologically, the carcinomata are grouped under the epithelial tissue tumors. *Subvarieties:* Squamous celled; cylindrical celled or columbar celled; glandular (scirrhus and encephaloid).

7. *Erysipelas* is caused by the *Streptococcus erysipelatis;* it appears in chains of varying lengths or in tangled masses, the presence or absence of oxygen does not seem to be of much importance, it grows at room temperature, and has the cultural characteristics of the *Streptococcus pyogenes.*

Syphilis is caused by the *Treponema pallidum;* this is a flexible spiral organism, with several turns, and a flagellum at each pole.

Puerperal infections: See Williams' "Obstetrics" (1909), page 852.

Basilar meningitis is tubercular. The tubercle bacillus is rod shaped, is from 1½ to 3½ mikrons in length, and about one-third to one-half a mikron in breadth, is a strict parasite, is not motile, and has no flagella; it has no spores.

is non-liquefying, non-chromogenic, erobic, and acid-resisting.

8. In *Malaria*, the infection is due to the bite of an anopheles mosquito which is already infected. In *typhoid* the typhoid bacillus is swallowed with food or drink which has become contaminated in some way. In *tuberculosis*, the tubercle bacillus is usually inhaled, but may be taken in with food and drink, or through wounded skin or mucous membrane. In *tetanus*, the tetanus bacillus generally gets into wounds (penetrating, or dirty, or gunshot, or "cracker," with earth).

9. *Protozoa* are unicellular animal organisms, of variable size (from that of bacteria to many centimeters in length), and of complex and little understood life cycle. *Examples:* Trypanosome, which causes sleeping sickness; and *Plasmodium malariæ*, which causes malaria.

10. The tape worm is an obligatory parasite; the bedbug is a facultative parasite. Yes, the colon bacillus may be a parasite.

MEDICAL JURISPRUDENCE.

1. *Six signs of death:* (1) The permanent cessation of circulation; (2) the permanent cessation of respiration; (3) rigor mortis; (4) loss of body heat, so that the body has the temperature of the room in which it is placed; (5) adipocere formation; (6) putrefaction.

2. Rigor mortis begins at a period varying from about fifteen minutes to eight hours. It is said to be due to the coagulation of the muscle plasma.

3. In *burns* produced *before death:* There is usually a blister, with a bright, red base, and containing a serous fluid, which is albuminous; occasionally there will be no blister if there has been excessive shock; also, there will be a red line of demarcation between the injured and the uninjured parts, and this, being a vital process, is only developed during life. In *burns* produced *after death* there is no true blister, no red base, and gas only is present in place of the serous fluid.

4. *Infanticide in a medicolegal sense* is the murder of a newborn child, which has a separate existence from its mother. In a *physiological sense* it would include the destruction of the life of a fetus or child before it was separated from its mother.

5. An *illusion* is a false or perverted impression received through one of the senses. *Example:* The whistling of the wind being mistaken for a voice telling a person to do a certain thing.

TOXICOLOGY.

1. See above, THERAPEUTICS, 6.

2. *Two reliable emetics:* Apomorphine hydrochloride,

dose gr. 1/10 by hypodermic; and wine of ipecac, dose ℥xx.

3. (*a*) For *arsenical preparations*, give freshly prepared solution of ferric hydroxide; (*b*) for *mineral acids*, give magnesia, or soap and water, or milk.

4. *Symptoms of acute phosphorus poisoning:* "Eructation of gas having the odor of garlic. The mouth, when observed in the dark, is frequently faintly luminous (phosphorescent). After several hours, pain in the throat, a sense of heat in the epigastrium, nausea, and vomiting. The vomited matters are sometimes bloody, and frequently luminous when agitated in the dark. The abdomen is tender, and there are diarrhea and colicky pains. After one or two days these symptoms cease, there remaining only pain in the back and limbs and a feeble pulse. Death sometimes occurs suddenly in from two to four days. Usually about the fourth day the patient becomes jaundiced, suffers from headache, insomnia, and retention of urine, rapidly becomes delirious and comatose, and dies." (From Witthaus' *Essentials of Chemistry and Toxicology.*)

5. Strictly speaking, carbonic acid gas is not a poison; it suffocates. Treatment, therefore, consists in removing the patient immediately to pure air, and instituting artificial respiration. After respiration is established, stimulation will be necessary.

HYGIENE AND PREVENTIVE MEDICINE.

1. The standing of water aids in the subsidence of foreign particles, and also (slightly) of organisms. It can be increased by the addition of precipitating agents (lime, alum, iron, etc.). Most of these substances have been suspended mechanically in the water, and the standing causes them to settle; but some have been in solution, and have become insoluble because the water is deprived of carbon dioxide by being exposed to the air.

2. River water may be rendered suitable for town consumption by filtration. Ordinary filter beds for the purification of water are tanks of varying size, shape, and construction; the walls may be vertical or sloping; upon the paved bottom are pipes to carry off the filtered water. Above these pipes are successive layers of coarse gravel, fine gravel, coarse sand, and at the top fine sand about four feet deep. Through these layers the water passes.

3. The intermittent system is the better, because it allows of aeration of the soil.

4. *Disinfection of privies and water closets:* "In the disinfection of these nothing is more convenient and effective than lime chloride, which is a mixture of various chlorine compounds, or milk of lime, freely used; the latter is made by adding one pound of freshly slaked lime

to two or three quarts of water. Lime chloride should be purchased in sealed packages only, otherwise its efficacy as a disinfectant is slight. Air-slaked lime is of no use as a disinfecting agent."—(Wilcox's *Fever Nursing.*)

5. Patients should be isolated, houses quarantined, children kept from school. For *disinfection of: Rooms,* use formaldehyde gas; *clothing,* use solutions of phenol (5 per cent.) for an hour, then boil for an hour.

STATE BOARD EXAMINATION QUESTIONS.

West Virginia State Board of Health.

ANATOMY AND EMBRYOLOGY.

1. Name the bony prominences of the elbow and the ligaments of the elbow joint.
2. Give articulations of the first cervical vertebra.
3. Where is the spleen and what are its uses?
4. Describe the two principal arteries of the forearm and tell how they form the palmar arches.
5. Of what does a vertebra consist? Name the processes and tell what their object is.
6. Describe the stomach.
7. Give a brief description of the facial nerve.
8. Name the muscles of the shoulder and arm.
9. Name the sutures and fontanelles in the fetal head.
10. Give difference in fetal and adult heart.

PHYSIOLOGY AND HISTOLOGY.

1. Mention briefly chemical and physical changes in the air and the blood caused by respiration.
2. Discuss sleep theories, naming three hypotheses.
3. Discuss the origin, function, and fate of the red blood corpuscles.
4. State in percentage ratio of weight of blood to that of body. What percentage of loss may be borne?
5. Define systolic, diastolic, and mean arterial pressure. How determined?
6. Define enzymes and discuss briefly their action.
7. Define protein, carbohydrate, and fat. Estimate their nutritive value.
8. What is bile? Discuss its physiological importance.
9. Discribe histology of a transverse section of the spinal cord at the cervical enlargement.
10. Discuss the histological structure of the blood.

MATERIA MEDICA AND THERAPEUTICS.

1. What is Materia Medica? What is Pharmacy?
2. What is opium? Give its derivatives and dose of each.

3. Give composition of Dover's powder; Fowler's solution; Lugol's solution.
4. Give five principal emetics, dose of each and method of administering.
5. Name five intestinal antiseptics.
6. Give physiological action of urotropin, its dose and method of administration.
7. What is a specific in medicine? Give examples and make therapeutic application.
8. Define anesthesia, give examples of general and local anesthetics.
9. Define pyrexia and hyperpyrexia. How would you meet these conditions?
10. What are the therapeutic indications in intestinal hemorrhage in typhoid fever?

CHEMISTRY AND MEDICAL JURISPRUDENCE.

1. Define Chemistry.
2. How many elements are there? How represented?
3. Give symbols of gold, silver, iron, lead, arsenic, potassium, mercury, calcium, and sodium.
4. Name elementary substances used in their pure state in medicine.
5. Define qualitative and quantitative analysis, with example of each.
6. What are mineral waters? Name three.
7. Define and illustrate an acid, base, and salt.
8. What is a poison? Illustrate.
9. What are evidences of death by drowning?
10. Evidences of rape?

BACTERIOLOGY AND HYGIENE.

1. Classify bacteria and give example of each.
2. Name the bacteria frequently found in soil, water, milk, and air.
3. What are toxins and antitoxins? Give example of latter.
4. What is meant by phagocytosis?
5. Describe sterilization and antisepsis.
6. How would you prepare specimen (diphtheria) to be sent to a laboratory for examination.
7. Describe pure water; how would you render it wholesome when contaminated?
8. Describe the location of well or spring in relation to privy vault or stable.
9. Describe the hygiene of a tuberculous patient.
10. Give causes of air contamination of school room and proper ventilation of same.

PRACTICE OF MEDICINE AND PEDIATRICS.

1. To what class of diseases does chorea belong? Give treatment and name important complications.
2. Give the prognosis and treatment in a case of aortic regurgitation with general arteriosclerosis.
3. Give treatment of acute endocarditis.
4. Give causes, symptoms, physical diagnosis, and treatment of acute croupous pneumonia.
5. Describe causes, tests, symptoms, and treatment of typhoid fever.
6. Diagnosis and treatment of pleuritic effusion.
7. Diagnose, treat, and give the cause of cholera infantum.
8. Write a prescription for modification of cow's milk for a child three months old.
9. What are the causes of convulsions in infants and children?
10. Give causes and treatment of summer diarrhea.

OBSTETRICS AND GYNECOLOGY.

1. What is the placenta? From what is it formed? What is its structure and what are its functions?
2. Name the bones, straits, and divisions of the obstetric pelvis.
3. What are the diameters of the pelvic outlet? How is it bounded?
4. Describe the fontanelles and their diagnostic uses.
5. What are the signs of pregnancy, probable, doubtful, and certain?
6. Interstitial nephritis in a pregnant woman, how would you treat?
7. Name the diseases of the endometrium and state their effects in pregnancy.
8. Define miscarriage, abortion, and premature labor.
9. Describe Credé's method for the delivery of the placenta.
10. What care does the mother require after labor? Define the nurse's duties.

SURGERY.

1. Give the methods of controlling hemorrhage.
2. Mention the uses of iodine in modern surgery.
3. Differentiate fracture of the surgical neck of the humerus from fracture of anatomical neck of humerus.
4. Diagnose and treat carbuncle.
5. Give treatment of shock.
6. Give symptoms and treatment of cholelithiasis.
7. Diagnose and treat Colles's fracture.
8. Give symptoms and treatment of erysipelas.

9. Give symptoms and treatment of prostatic abscess.
10. Give symptoms and treatment of strangulated inguinal hernia.

SPECIAL PRACTICE.

1. Give the symptoms of infantile spastic paralysis.
2. Differentiate between epileptic and hysteroid seizures.
3. Name the causes and dangers of otorrhea.
4. In what acute disease is the ear most commonly involved, and, as a rule, what part of the general structure of the ear is first attacked?
5. Name the conjunctival diseases due to microorganisms.
6. Name four causes of iritis, and note the subjective and objective symptoms.
7. In nephritis where does the effusion of serum first appear? In cirrhosis of the liver, where? In cardiac diseases, where?
8. State the diagnostic value of a blood examination in chlorosis; appendicitis; trichinosis.
9. Give cause, symptoms, pathology, and treatment of laryngismus stridulus.
10. Give symptoms and treatment of nasal polypi.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

WEST VIRGINIA STATE BOARD OF HEALTH.

ANATOMY AND EMBRYOLOGY.

1. The *bony prominences of the elbow* are: Internal condyle of humerus, external condyle of humerus, and olecranon process of ulna.

Ligaments of elbow joint: Anterior, posterior, internal lateral, external lateral, capsular, and orbicular.

2. First cervical vertebra articulates with the occipital bone and with the axis.

3. The spleen is situated below the diaphragm, between the diaphragm and the fundus of the stomach; it is chiefly in the posterior part of the left hypochondriac region, but it extends also into the epigastric region.

The spleen has been held to be: (1) a place where the white blood corpuscles are made; (2) a place where the red blood corpuscles are made during fetal life; (3) a place where the red blood corpuscles are destroyed; (4) the place where uric acid is made; (5) the source of an enzyme which converts the trypsinogen of the pancreas into trypsin.

4. The two principal arteries of the forearm are the radial and ulnar. The *radial artery* is the continuation

of the brachial, and begins at the bend of the elbow, and passes down the radial side of the forearm to the wrist and to the outer side of the carpus, and into the palm of the hand. It is covered by the skin and fascia and supinator longus; behind it are the radius, pronator quadratus, flexor longus pollicis, flexor sublimis digitorum, pronator radii teres, supinator brevis and tendon of biceps; on inner side are pronator radii teres, and flexor carpi radialis; on outer side are supinator longus and radial nerve. The *ulnar artery* commences at the bifurcation of the brachial at the bend of the elbow, crosses obliquely the inner side of the forearm, then along the ulnar border to the wrist and crosses the annular ligament. It is covered by fascia, flexor muscles (superficial layer) and median nerve; behind it are the brachialis, anticus and flexor profundus digitorum; on the outer side the flexor sublimis digitorum, and on the inner side, the flexor carpi ulnaris, and ulnar nerve.

The *superficial palmar arch* is formed by the ulnar artery, and is completed by the ulnar artery anastomosing with a branch of the radial (superficial volar or princeps pollicis). It gives off the four digital branches. The surface marking is a line drawn transversely across the palm from a point where the web of the thumb joins the palm. The *deep palmar arch* is formed by the radial artery, and is completed by the radial artery anastomosing with a deep branch of the ulnar. Its branches are the palmar interosseous, perforating, and palmar recurrent arteries. The surface marking is a line drawn transversely across the palm, one-half inch nearer the wrist than the superficial arch.

5. *A vertebra consists of:* Body (or centrum) and neural arch; this latter consists of two pedicles, two laminæ, and seven processes. These processes are: one spinous, two transverse, and four articular. The spinous and transverse processes are for the attachment of muscles and ligaments; the articular processes are for articulation with the vertebræ immediately above and below.

6. *Stomach* is conical, with base to left side; the upper border is concave, and is called the *lesser* curvature; the lower border is convex, and is named the *greater* curvature. The left extremity is known as the *fundus;* above and to the right of which is the *cardiac* orifice, and the right or small end is termed the *pyloric* extremity. It occupies left hypochondriac and epigastric regions. Its *orifices are cardiac*, above, communicating with the esophagus; *pyloric* at the right extremity, passing into the duodenum. It is 10 to 12 inches long, 4 to 5 inches in diameter at widest part. Its *left* or *cardiac end* is fixed *by esophagus*

and gastrophenic ligament to diaphragm, lying beneath the seventh left costal cartilage, 1 inch from sternum; it is connected with the spleen by the gastroplenic omentum. The *right* or *pyloric end* reaches the gall-bladder, touching under part of quadrate lobe of liver; is very movable; when stomach is empty is in midline 4 inches below tip of gladiolus. *Anterior surface,* which also looks upward, is in contact with, from left to right, diaphragm, abdominal parietes (epigastric region), under surface of liver. *Posterior surface* is separated from pancreas, crura of diaphragm, aorta, vena cava inferior, and solar plexus, by lesser sac of peritoneum. *Superior border* is attached to liver by small omentum. *Inferior border* gives attachment to great omentum. *Coronary* and *pyloric* arteries run along lesser curvature; *right* and *left gastropiploie,* along inferor or greater curvature; *vasa brevia,* from the splenic to fundus. *Right pneumogastric* nerve supplies to posterior surface; *left pneumogastric,* the anterior surface; *sympathetic,* from the solar plexus, both surfaces.—(*Aids to Anatomy.*)

7. The *seventh or facial nerve* has its superficial origin in the upper end of the medulla oblongata, in the groove between the olivary and restiform bodies. It passes "forward and outward to enter the internal auditory meatus; it lies upon a groove on the auditory nerve, with portio intermedia of Wrisberg between, and at the bottom of the meatus it enters the aqueductus Fallopii, along which it runs first outward between cochlea and vestibule as far as hiatus Fallopii; then backward in internal wall of tympanum, just above fenestra ovalis, at the turn presenting a swelling, the *geniculate ganglion;* and finally it passes downward to emerge from the bone at the stylomastoid foramen; it then passes outward and forward in the parotid, dividing behind the ramus of the jaw into *temporo-facial* and *cervico-facial* branches, which further subdivide and intercommunicate, forming the *pes anserinus.*"—(*Aids to Anatomy.*)

It supplies the muscles of expression in the face, the muscles of the external ear, the Platysma, Buccinator, Stylohyoid, and the posterior belly of the Digastric.

8. *Muscles of the shoulder and arm:* Deltoid, subscapularis, supraspinatus, infraspinatus, teres major, teres minor, coracobrachialis, biceps, brachialis anticus, triceps, and subanconeus.

9. *Sutures of the fetal head:* Coronal, sagittal, lambdoid. *Fontenelles:* Anterior, posterior, and four unimportant ones (two at the inferior angles of the parietal bones on each side).

10. In *the fetal heart are:* (1) Direct communication between right and left auricles, by the foramen ovale;

(2) the Eustachian valve, guarding the opening of the inferior vena cava into the right auricle.

PHYSIOLOGY AND HISTOLOGY.

1. Respiration causes changes in the *air*, as follows:

	EXPIRED AIR.	INSPIRED AIR.
Oxygen.....	16.6 per cent.	21 per cent.
Nitrogen	79 per cent.	79 per cent.
Carbon dioxide ..	4.4 per cent.	0.04 per cent.
Other gases	Often present.	Rare.
Watery vapor ...	Saturated.	Variable.
Temperature	That of body.	Variable.
Volume	Diminished.	Varies.
Bacteria	None.	Always present.
Dust	None.	Always present.

Respiration causes changes in the *blood*, as follows: *Arterial* blood is red, slightly warmer, more coagulable, more uniform in composition, contains more oxygen and less carbon dioxide; *venous* blood is purple, slightly cooler, less coagulable, less uniform in composition, and contains more carbon dioxide and less oxygen.

2. "There are several hypotheses as to the causation of sleep. It has been attributed to cerebral anemia; to chemical changes in the brain cells or neurons, such as an exhaustion of their intramolecular oxygen, or an accumulation of fatigue products; to a contraction of the dendritic processes, and a consequent break in the transmission of nervous impulses; to an expansion of the neuroglial cell processes insulating the nerve cell processes, and producing the same effect; and to a purely psychological condition, namely, loss of consciousness apart from any physical or chemical change. This last explanation is simply a cloak for our ignorance. The most probable hypothesis is that of an altered metabolism of the cerebral cells dependent upon exhaustion and diminished influx of stimuli." (Allbutt's *System of Medicine.*)

3. RED BLOOD CORPUSCLES. *Origin:* Red bone marrow, liver, and spleen. *Function:* To take up oxygen from the lungs and carry it to the tissues. *Fate:* Supposed to be destroyed in the spleen, also in the liver cells.

4. The blood is said to be about one-thirteenth of the weight of the body; recently this figure has been altered to one-twentieth of the body weight. "Just what percentage of loss (of blood) may be borne by the human being has not been determined, but it is probable that a healthy individual may recover without serious difficulty from

the loss of a quantity of blood amounting to as much as three per cent. of the body weight." (Howell.)

5. "The maximum pressure caused by the systole of the heart, the apex of the pulse wave, is spoken of as *systolic pressure;* the minimum pressure in the artery—that is the pressure at the end of the diastole of the heart, or the bottom of the pulse wave, is known as the *diastolic pressure.* . . . In speaking of the pressure in the blood-vessels we refer usually to what is called the *mean pressure.* It is obvious that, so far as the larger arteries are concerned, the *mean pressure* is only a convenient expression for the average pressure during a certain period. If we know at any moment the systolic and the diastolic pressure in an artery we can estimate the mean pressure with approximate accuracy by taking the arithmetical mean of the two figures." (Howell.)

Blood pressure is determined by a sphygmomanometer.

6. *Enzymes* are substances produced by living cells and which act by catalysis. The enzyme remains unchanged and exerts its activity only upon certain definite substances.

ENZYMES.	ORIGIN.	FUNCTIONS.
Ptyalin.	Saliva.	Changes starches into dextrin and sugar.
Pepsin.	Gastric juice.	Changes proteids into proteoses and peptones in an acid medium.
A curdling ferment.	Gastric juice.	Curdles the casein of milk.
Trypsin.	Pancreatic juice.	Changes proteids into proteoses and peptones, and afterward decomposes them into leucin and tyrosin in an alkaline medium.
Amylopsin.	Pancreatic juice.	Converts starches into maltose.
Steapsin.	Pancreatic juice.	Emulsifies and saponifies fats.
A curdling ferment.	Pancreatic juice.	Curdles the casein of milk.
Invertin.	Succus entericus.	Converts maltose into glucose.

7.

FOOD.	FUNCTIONS.
Proteins.	
1. All substances containing nitrogen, of a composition identical with, or nearly that of albumin; proportion of N to C being nearly as 2 to 7.	Formation and repair of tissues and fluids of the body. Regulation of the absorption and utilization of oxygen. May also form fat and carbohydrate, and yield energy sometimes. In most foods the above, both animal and vegetable, are largely converted into albumoses and peptones during digestion. These perform the above functions less perfectly, or only under particular circumstances.
2. Substances containing a larger proportion of N are apparently less nutritious; proportion of N to C about 2 to 5½. 3. Extractive matters, such as are contained in the juice of the flesh.	These substances appear essentially as regulators of digestion and assimilation, especially with reference to the gelatin group.
Carbohydrates.	
Substances containing no N. but made up of C, H and O; the O being exactly sufficient to convert all the H into H_2O.	Production of energy and animal heat by oxidation. Form fats and possibly some proteids.
Fats.	
Substances containing no N, but made up of C, H and O; the proportion of O being *less* than sufficient to convert all the H into H_2O.	Supply of fatty tissues, nutrition of nervous system; supply of energy, and animal heat by oxidation.
Salts.	Support of bony skeleton, supply of HCl for digestion, regulation of energy and nutrition.

(Notter and Firth's *Hygiene.*)

Proteins, carbohydrates, and fats are all necessary in a well-ordered diet.

8. Bile is a secretion of the liver; it contains water and solids. The latter are bile salts (sodium taurocholate and sodium glycocholate), mucin, bile pigments (bilirubin and biliverdin), cholesterin, lecithin, neutral fats, and inorganic salts (NaCl, KCl, and phosphates).

The functions of the bile are: (1) To assist in the emulsification and saponification of fats; (2) to aid in the absorption of fats; (3) to stimulate the cells of the intestine to increased secretory activity, and so promote peristalsis, and at the same time tend to keep the feces moist; (4) to eliminate waste products of metabolism, such as lecithin and cholesterin; (5) it has a slight action in converting starch into sugar; (6) it neutralizes the acid chyme from the stomach and thus inhibits peptic digestion; (7) it has a very feeble antiseptic action.

9. In transverse section, *outline of cord* transversely oval; in the middle of the cervical swelling the transverse diameter being nearly one-third longer than the antero-posterior diameter. *Postero-median cleft* very deep, extending beyond the center of cord; *antero-median cleft* shallow. *Gray matter* greatly increased in quantity in the cervical swelling: anterior horn thick and massive; posterior horn slender in comparison. Lateral horn only evident above the level of the fourth cervical nerve. Formatio reticularis strongly marked. *White matter* in great quantity, and especially massed in the lateral and posterior columns. *Posterior paramedian groove* and septum well marked. *Central canal* considerably nearer the anterior surface than the posterior surface of the cord. (From Cunningham's *Anatomy.)*

10. The blood is composed of plasma, red corpuscles, white corpuscles, and platelets.

The *red corpuscles* are biconcave discs, about 1/3200 of an inch in diameter; they are non-nucleated, and there are about 4,500,000 or 5,000,000 of them in each cubic millimeter of blood. They contain hemoglobin.

The *white corpuscles* are spheroidal masses, varying in size, having no cell wall, and containing one or more nuclei; there are about 7,000 to 10,000 of them in each cubic millimeter of blood. They differ much in appearance, and are divided into (1) small mononuclear leucocytes, or lymphocytes, (2) large mononuclear, (3) transitional, (4) polynuclear, or polymorphonuclear, or neutrophile, and (5) eosinophile. They are all more or less granular, particularly the last two varieties named.

There are also *platelets*, which are very small, colorless, irregular shaped bodies; they are about one-fourth the diameter of a red corpuscle. In number they vary from

about 200,000 to more than 500,000 in each cubic millimeter of blood.

MATERIA MEDICA AND THERAPEUTICS.

1. *Materia medica* is the name given to the agents used in the treatment of disease.

Pharmacy is the art of preparing drugs in a suitable form, and of dispensing them.

2. *Opium* is the exudation obtained from incising the unripe capsules of the *Papaver somniferum* (white poppy).

Official derivatives with doses: Powdered opium, gr. j; extract of opium, gr. ss; powder of ipecac and opium, gr. vijss; vinegar of opium, ♏viij; camphorated tincture of opium, 3ij; tincture of deodorized opium, ♏viij; granulated opium, gr. jss; wine of opium, ♏viij; morphine, gr. 1/5; morphine sulphate, acetate, and hydrochloride, each, gr. ¼; codeine, gr. ½; codeine sulphate and phosphate, each, gr. ½; apomorphine hydrochloride, gr. 1/10.

3. *Dover's Powder* is composed of ipecac, powdered opium, and sugar of milk.

Fowler's Solution is composed of arsenic trioxide, potassium bicarbonate, compound tincture of lavender, and distilled water.

Lugol's Solution is composed of iodine, potassium iodide, and distilled water.

4. *Five emetics:* Apomorphine hydrochloride, dose gr. 1/10; ipecac, dose of the fluidextract, ♏xv; tartar emetic, dose gr. ½; zinc sulphate, dose, gr. xv; copper sulphate, dose gr. iv. Atropin is given hypodermically; the others are administered by the mouth.

5. *Five intestinal antiseptics:* Salol, thymol, naphthol, naphthalin, and guaiacol.

6. Urotropin, when taken, is decomposed in the body, and formaldehyde is liberated and eliminated in the urine; hence it is used as a urinary (and intestinal) antiseptic, dose gr. iv, administered in water.

7. *A specific* is an agent which has a selective curative effect on a particular disease. Examples: Quinine on malaria; mercury on syphilis; diphtheria antitoxin in diphtheria.

8. *Anesthesia* is the condition characterized by loss of sensation (and in general anesthesia by loss of consciousness also). *General anesthetics:* Ether, chloroform, nitrous oxide, ethyl chloride; *local anesthetics:* Cocaine, eucaine, ethyl chloride, ether spray.

9. *Pyrexia* is fever; *hyperpyrexia* is very high fever (above 105° F.). The treatment is by antipyretics.

The following table (from Potter's "Materia Medica") gives the chief antipyretics with their manner of action.

Temperature depression may be done by five different actions working upon two principal lines, viz., by:

(*a*) *Lessening heat production, by*
- (1) diminishing tissue change,
- (2) reducing the circulation.

(*b*) *Promoting heat loss, by*
- (3) dilating cutaneous vessels, thus increasing heat radiation.
- (4) promoting perspiration—its evaporation lowering the temperature.
- (5) abstracting heat from the body.

The following list of antipyretics includes a few for each of the above-named actions, to which the numbers refer in each case, viz.:

Quinine, 1.	Aconite, 2.	Antipyrin, 1, 4.
Phenol, 1.	Alcohol, 1, 3.	Antimony, 2, 4.
Salicin, 1.	Nitrous ether, 3, 4.	Cold bath, 5.
Digitalis, 2.	Acetanilid, 1, 4.	Cold drinks, 5.
	Phenacetin, 1, 4.	Wet-pack, 5.

10. In intestinal hemorrhage in typhoid fever, the best thing is to keep the intestine at rest. Dover's powder in ten grain doses is indicated. Food should be cold, and should be such as does not leave any unabsorbed residue. Iced water in small quantities may be given to allay thirst. Turpentine is also useful, two capsules each containing three minims may be given every four hours.

CHEMISTRY AND MEDICAL JURISPRUDENCE.

1. *Chemistry* is that branch of science which treats of the composition of substances, their changes in composition and the laws governing such changes.

2. There are about eighty elements. Elements are represented by symbols.

3. *Symbols:* Gold, Au; silver, Ag; iron, Fe; lead, Pb; arsenic, As; potassium, K; mercury, Hg; calcium, Ca; sodium, Na.

4. *Elementary substances used in their pure state in medicine:* Oxygen, chlorine, iodine, sulphur, carbon, phosphorus, mercury, and iron.

5. *Qualitative analysis* is the determination of the nature of the elements which enter into the composition of a substance. Thus, determining that hydrogen, sulphur, and oxygen are contained in sulphuric acid. *Quantitative analysis* is the determination of the amount as well as the nature of the elements which enter into the composition of a substance. Thus, determining that sulphuric

acid contains two parts by weight of hydrogen, 32 of sulphur, and 64 of oxygen.

6. *Mineral waters* are waters which are of therapeutic value by reason of the nature or quantity of dissolved solids which they contain, or which have a temperature greater than 68° F. *Examples:* Hunyadi, Saratoga Springs, and Vichy.

7. *Acids* are compounds of an electronegative element or radical with hydrogen, part or all of which hydrogen they can part with in exchange for an electropositive element, without formation of a base. *Examples:* Sulphuric acid, H_2SO_4; nitric acid, HNO_3.

Bases are ternary compounds capable of entering into double decomposition with an acid to produce a salt and water. *Examples:* Potassium hydroxide, KOH; calcium hydroxide, $Ca(OH)_2$.

Salts are substances formed by the substitution of an electropositive element for part or all of the replaceable hydrogen of an acid. *Examples:* Sodium nitrate, $NaNO_3$; Monopotassic sulphate, $KHSO_4$.

8. A *poison* is any substance which, being in solution in, or acting chemically upon, the blood, may cause death or serious bodily harm. Thus arsenic, after being absorbed, is a poison. But corrosives, such as sulphuric acid, act locally; so, if a man fell into a vat of sulphuric acid, though he might die from it, it would not be correct to say he was poisoned.

9. *In death by drowning:* The surface is pallid, the face appears tranquil, the eyes and mouth being partly open. The skin often has the appearance known as gooseskin, and, if the body has lain upward of twelve hours in the water, that of the hands and the feet is sodden by inhibition. The most important external sign is the presence on the mouth and nostrils of a fine froth (possibly blood stained), composed of air, mucus, and the medium in which drowning took place; if the body remains three or four days in water, the froth disappears. Exceptionally, fragments of weeds or other small objects may be found tightly grasped in the hands. On opening the thorax the lungs, gray in color, with reddish staining, are seen to be very voluminous, a condition known as ballooning, partly due to infiltration of the lung tissue with some of the medium in which drowning took place, and partly to true edema. The lung substance is inelastic and pits on pressure. On section, fluid and froth resembling that found on the lips exude from the divided air passages. Minute subpleural hemorrhages are not infrequently present, and the pleural cavities may contain fluid. The stomach often contains water or other liquid which was involuntarily swallowed during attempts at respiration. Occasionally

some of this fluid is forced by vital action into the intestines. With one exception, the remaining appearances are those met with after death from asphyxia. The exception is constituted by the blood, which is not only dark colored and fluid, as is usual after death from asphyxia, but is also diluted by the imbibition of water from the stomach and lungs.—(Quain's *Dictionary of Medicine.*)

10. The *medical evidence of rape* is based on: (1) Marks of violence about the woman's genital organs; (2) wounds, bruises, or other marks of injury on the woman or on the accused; (3) blood stains and seminal stains on the person or clothing of either party; and (4) the presence of any venereal disease on either party.

BACTERIOLOGY AND HYGIENE.

1. *Bacteria are classified* as: (1) *Cocci,* which are round or oval, and may appear singly, in pairs, in chains, or in groups; example—streptococcus of erysipelas. (2) *Bacilli,* which are rod shaped, with the longer sides parallel and the short ends either straight, rounded, or concave; example—bacillus of tetanus. (3) *Spirilla,* which are spiral; example—spirillum of relapsing fever.

2. *Bacteria found in soil: Bacillus tetani, Bacillus, edematis, Bacillus aërogenes capsulatus, Bacillus proteus, Bacillus subtilis,* anthrax bacillus, typhoid bacillus, *Bacillus coli communis, Bacillus proteus.*

Bacteria found in water: Typhoid bacillus, cholera spirillum, streptococci, *Bacillus proteus, Bacillus aërogenes capsulatus, Bacillus subtilis, Bacillus fluorescens liquefaciens, Bacillus coli communis.*

Bacteria found in milk: Bacillus of lactic acid, *Streptococcus lacticus, Bacillus aërogenes,* bacillus of anthrax and of malignant edema; bacillus of typhoid, of tuberculosis, of cholera, and of diphtheria.

Bacteria found in air: Bacillus subtilis, tubercle bacillus, pyogenic cocci, various forms of micrococci and sarcinæ.

3. *Toxins* are the poisonous products of pathogenic bacteria or of ptomaines or leucomains. *Antitoxins* are substances formed in the body, of a protective character, and capable of rendering inert the poisonous products of bacteria. *Examples:* Antitoxins of diphtheria, plague, streptococcus, tetanus, tuberculosis, and typhoid.

4. *Phagocytosis* is the faculty of certain cells (notably the mononuclear and polynuclear leucocytes) to take up and destroy bacteria.

5. *Sterilization* is the destruction of all micro-organisms on or about a substance. *Antisepsis* is the process of destroying germs. Sterilization is done most effectively by dry heat; next to this may be placed various chemicals.

6. To *obtain a culture:* A sterile swab is rubbed over

any visible membrane on the tonsils or throat, and is then immediately passed over the surface of the serum in a culture tube. The tube of culture, thus inoculated, is placed in an incubator at 37° C. for about twelve hours, when it is ready for examination. A sterile platinum wire is inserted into the culture tube, and a number of colonies of a whitish color are removed by it, and placed on a clean cover slip, and smeared over its surface. The smear is allowed to dry, is passed two or three times through a flame to fix the bacteria, and is then covered for about five or six minutes with a Loeffler's methylene-blue solution. The cover slip is then rinsed in clean water, dried, and mounted. The bacilli of diphtheria appear as short, thick rods with rounded ends; irregular forms are characteristic of this bacillus, and the staining will appear pronounced in some parts of the bacilli and deficient in other parts.

7. *Pure water* is colorless, odorless, cool, without disagreeable or salt or sweetish taste, and is free from bacteria, poisons, foreign bodies, etc.

Characteristics of a good drinking water: (1) It should be clear and limpid. Cloudy and muddy waters should be avoided. (2) It should be colorless. A greenish or yellowish color is usually due to vegetable or animal matter in solution or to organisms. (3) It should be odorless; especially free from sulphuretted hydrogen or putrefactive animal matter. (4) It should not be too cold, but should have a temperature of from 46° F. to 60° F. (5) It should have an agreeable taste; neither flat, salty, nor sweetish. A certain amount of hardness and dissolved gases give a sparkling taste. It should contain from 25 to 50 c.c. of gases per liter, of which 8 to 10 per cent. is carbon dioxide and the rest oxygen and nitrogen. (6) It should be as free as possible from dissolved organic matter, especially of animal origin. (7) It should not contain too great an amount of hardness. A certain quantity of saline matter is necessary, however, to give it a good taste. It should not contain over three or four parts of chlorine in 100,000 parts of water.—(From Bartley's *Chemistry.*)

Contaminated water is purified by: Distillation, boiling, filtration, precipitation, and various chemical processes.

8. "It is a common belief that if the well is located in higher ground than the cesspool there can be no danger of pollution of the water. This, however, is a most fallacious proposition, for it is not so much the location of the outlet of the well that determines the possibility of pollution as the relative position of the cesspool and the point where the water enters the well. . . . Again, the geological formation may be such that a cesspool on higher ground than the nearby well will have no influence on the

purity of the water. Thus a ledge of rock may crop up between them, and divert the flow of polluting matters away from the well." (Harrington's *Hygiene.*)

9. Hygienic precautions to be taken in treating a case of tuberculosis: "The patient's quarters should be free from dust, and admit of spending many hours daily in the open air in all weathers, properly sheltered, and, if very ill, lying wrapped in a hammock or reclining chair. His bedroom should be well aired at night, draughts being avoided. The room should be uncarpeted and free from hangings. It should be often cleaned and periodically disinfected. All sputum should be collected in paper spit-cups, which should be burned daily. Smoking should be forbidden. Harm is done by any exercise which results in fatigue, and while fever exists it should not be attempted at all. Patients should be taught the necessity of practising lung gymnastics and breathing only through the nose, which should be kept clear and free from occlusion by secretions, or an hypertrophied catarrhal mucosa. . . . The clothing should be woolen, but not too heavy, or sweating is increased; and a flannel nightgown and loosely knit leggings should be worn at night in cool weather. The skin should be cleansed by daily sponge baths of lukewarm alcohol and water."—(Thompson's *Practical Medicine.*)

10. Air of schoolrooms may be contaminated by the respiration of scholars and teachers; products of combustion from the heating apparatus, also from the lighting apparatus, dust, epithelial cells, and disease germs.

Modern methods of heating and lighting should be adopted; ample ventilation should be insisted on; children who are not in good health should be excluded, the schoolroom should not be used for any purpose after school hours.

PRACTICE OF MEDICINE AND PEDIATRICS.

1. Chorea is classified as a functional nervous disease. *Treatment:* Rest in bed; easily digested food, milk; arsenic, chloral, bromides; tea, coffee, and alcoholic drinks are to be forbidden. *Complications:* Endocarditis, rheumatism, exhaustion.

2. Prognosis is unfavorable. The patient should be moderate in eating and drinking, avoid undue exercise, should rest in bed at times; venesection may help. Special symptoms must be treated. Saline laxatives and diuretics are necessary. Digitalis, or stropanthus, or nitroglycerin may be indicated.

3. The treatment of acute endorcarditis is that of the primary condition, and, in addition, rest in bed, liquid diet, ice-coil to the precordium, and salicylates in large

doses (3i daily) should be prescribed. Opium may be necessary. Iron and arsenic are indicated during the convalescence. Prolonged rest in bed is essential. The treatment of malignant endocarditis is that of septicemia. Stimulation should be vigorous, and the antistreptococcus serum may be employed in suiable cases.

4. CROUPOUS PNEUMONIA. *Causes:* Diplococcus pneumoniæ of Frankel. Lowered vitality, bad hygiene, Bright's disease, infectious fevers, exposure to cold and wet all predispose.

Symptoms: "The disease usually begins with a decided chill and a sharp pain in the side, followed by a rapid rise of temperature; the latter often attains its maximum (104°-105°) in twenty-four hours, and generally continues high, with slight diurnal remissions, until the ninth day, when it falls by crisis, frequently reaching the norm by the tenth day. Occasionally the temperature falls by lysis. There is marked dyspnea; the respirations are shallow and rapid, ranging from 40 to 80 per minute, thus making the ratio between respiration and the pulse 1 to 3 or 1 to 2. Cough is a prominent symptom; at first it is short and dry, but later it is accompanied by bloody ("rusty"), translucent, and tenacious sputa. Microscopically, the sputum contains red blood-corpuscles, their free pigment, pus-corpuscles, diplococci, and other micro-organisms. The face is flushed; the lips are cyanosed and often the seat of an herpetic eruption; the tongue is heavily furred; the bowels are constipated; and the urine is scanty, high-colored, deficient in chlorides, and often slightly albuminous. In severe cases delirium is rarely absent."—(Stevens.)

Diagnosis: Pleurisy.—Here the initial chill is not so marked; the fever is not so high nor the pulse so rapid; and there is no "rusty" sputum; but bulging and displacement of the apex-beat are often noted on inspection; the percussion-dullness may change with the posture of the patient; vocal resonance and vocal fremitus are diminished; and the breathing is distant and weak. *Acute Phthisis.*—Irregular fever, bacillus tuberculosis in the sputum, and the continuation of grave symptoms with signs of softening after the ninth or tenth day, will suggest the diagnosis of tuberculosis. *Pulmonary edema.* — Here there is absence of chill, fever, and pain; the expectoration is watery, not "rusty;" both lungs are commonly affected; auscultation reveals abundant subcrepitant râles and weak breathing. *Typhoid Fever.*—Typhoid pneumonia may be readily mistaken for typhoid fever with penumonia; but pneumonia as a complication occurs late in the disease, so that the history of the onset gives much assistance.—(Stevens.)

Treatment: "Consists in rest in bed, milk diet, and the

administration of fractional doses of calomel followed by a saline in the early stage. The nervous symptoms and temperature may be controlled by applying ice-bags or compresses wrung out of cold water (60°-70° F.) to the chest or by the use of the warm or cold wet-pack. The heart and pulse should be sustained by the administration of alcohol, strychnine (gr. 1/60-1/20), atropine, caffeine, strophanthus, and nitroglycerin. Digitalis may also be employed. Inhalations of oxygen afford temporary relief when the dypsnea and cyanosis are extreme. In young, vigorous, and plethoric adults, with hyperpyrexia and a high-tension pulse, bleeding may be beneficial in the first 48 hours. Convalescence should be guarded, and tonics, stimulants, etc., will be found very useful in this period of the disease."—(*Pocket Cyclopedia.*)

5. *Cause* of typhoid is the *Bacillus typhosus* of Eberth. It is conveyed in food and drink, by fingers and flies.

The Widal reaction: "Three drops of blood are taken from the well-washed aseptic finger tip or lobe of the ear, and each lies by itself on a sterile slide, passed through a flame and cooled just before use; this slide may be wrapped in cotton and transported for examination at the laboratory. Here one drop is mixed with a large drop of sterile water, to redissolve it. A drop from the summit of this is then mixed with six drops of fresh broth culture of the bacillus (not over twenty-four hours old) on a sterile slide. From this a small drop of mingled culture and blood is placed in the middle of a sterile cover-glass, and this is inverted over a sterile hollow-ground slide and examined. . . . A positive reaction is obtained when all the bacilli present gather in one or two masses or clumps, and cease their rapid movement inside of twenty minutes." —(From Thayer's *Pathology.*)

Symptoms: Insidious onset, weakness, headache, epistaxis, vagus pains. The temperature rises gradually, about 2° in the evening, and falling 1° in the morning. Diarrhea, tenderness in the right iliac fossa, enlarged spleen, and a characteristic rash which appears from seventh to twelfth day. During the second week the temperature remains at a uniform level; typhoid state and delirium may be present. The pulse becomes rapid, weak, and dicrotic; the heart sounds are feeble; the tongue is coated, fissured, and tremulous; sordes appear on the teeth; the abdomen is distended; the stools are yellowish and offensive (said to be like pea soup); the Widal reaction may be positive. In the fourth week the temperature becomes normal.

The *treatment* is largely supportive and prophylactic. On account of the wide distribution of the bacilli in the secretions it is highly important that the excreta and all substances which come in contact with the patient should

be thoroughly disinfected to prevent dissemination of the disease. Corrosive sublimate (1:500), carbolic acid (1:10), and chlorinated lime are used to disinfect the stools. Weaker solutions may be employed for sponging the perineum and anal region of the patient and for washing the hands of the attendants. The general treatment consists in absolute rest in bed with the enforced use of the bed-pan. The diet should be liquid, largely milk, and should be administered every three hours. Fever should be controlled bv sponging, by the wet pack, and by the full bath. The Brand method consists in immersion of the body in a tub of water (70° F.) for fifteen or twenty minutes every third hour when the temperature rises above 102.5° F. The medicinal treatment includes the use of antipyretics, intestinal antiseptics, and antityphoid serum. Abdominal pain, tympanites, and tenderness are best treated with fomentations and turpentine stupes, while meteorism may be relieved by the internal administration of turpentine and by the use of the rectal tube or injections of the milk of asafetida (ʒ5-6). Diarrhea, when it exceeds four or five stools daily, will require the withholding of all food except milk and the administration of opium, bismuth, codeine, naphthalin, etc. Constipation should be relieved every two days by enemata containing soapsuds.

6. *Pleuritic effusion* gives a bulging of the intercostal spaces, displacement of heartbeat sometimes, dyspnea, tactile fremitus is diminished or absent, percussion is dull or flat, the fluid follows the line of Ellis' curve. Skoda's tympanitic resonance is observed. *Treatment:* Rest in bed, dry food, saline laxatives, counterirritation by mustard or iodine, hot bath, diaphoretics, diuretics, and paracentesis.

7. *Cholera infantum* is caused by bacteria or their toxins in milk.

Symptoms: Diarrhea is the initial symptom. The stools are more or less fecal, but soon become watery, colorless, and odorless. In some cases they may be of a brownish-green color with a musty odor. There are restlessness, high fever (105-108° F.), thirst, vomiting, and purging. The child rapidly wastes, and the surface temperature falls. The urine is scanty or suppressed, and the child becomes apathetic, which condition may pass on to convulsions, stupor, and death.

Treatment: Ordinary diarrhea, should be prevented from terminating in cholera infantum. The stomach and colon should be irrigated. From ʒ2-4 of water at 100° F. should be allowed to flow into the stomach through a soft-rubber catheter and be siphoned out. This should be done only once. For the colon, soda bicarbonate, ʒi, should be added to the pint, and the irrigation performed twice daily. If the rectal temperature is very high ice-cold water should

be used; otherwise warm water. When symptoms of collapse appear hot pack is used. Ice-water quenches the thirst, even if it is vomited. Champagne and drop-doses of brandy may be given if the stomach is tolerant. Strychnine, gr. 1/100 to 1/48, hypodermically, to a child one year old, is a valuable stimulant. Morphine, gr. 1/100, and atropine, gr. 1/800, may be given in the same way and repeated every hour until the child is quieted.—(*Pocket Cyclopedia.*)

8. For an infant of three months, Winters advises the following:

Take the upper eleven ounces from a quart of milk, 16 hours after milking.

Milk-sugar, about 7½ teaspoonfuls.

Lime-water, 4 ounces.

Filtered water, enough to make one quart.

Quantity at each feeding, 3 ounces.

Eight feedings, at 6, 8:30, 11 A. M.; 1:30, 4, 6:30, 9 and 12 P.M.

9. Causes of infantile convulsions are: "Overeating, especially of indigestible food; rachitis, debility from exhausting diarrheal diseases; high fever, especially at the onset of the acute specific infections; very seldom dentition, phimosis, and acute middle-ear inflammation; injuries to the brain at birth, infantile hemiplegia, meningitis, and tumor of the brain; rarely of spinal cord disease.—(From Butler's *Diagnostics of Internal Medicine.*)

10. *Summer diarrhea* is caused by hot weather, improper food, bad hygiene, lowered vitality, exposure, and inflammation of the intestinal tract. *Treatment:* Hygiene should be improved and exposure prevented. Feeding should be corrected. Cleanliness is imperative. Woolen clothing should be worn next to the skin when there is susceptibility to changes in the atmosphere. During the attack all food should be withheld for from twelve to thirty-six hours, and the child placed in bed. The thirst may be quenched by water, ice, barley-water, etc. If the child is weak, brandy, gtt. 10-15, may be given. For the abdominal pain warm baths, turpentine stupes, spice poultice, and mustard plaster may be necessary. When food is given again it must be weak and in small quantities. The alimentary canal should be cleared of all irritating material by syrup of ipecacuanha, 3i, if the stomach contains food, or by castor oil, equal parts of castor oil and aromatic syrup of rhubarb, 3i every hour until free bowel movement, or calomel, gr. ½, with soda bicarbonate, gr. 1, for four or five doses. The colon should be irrigated once or twice daily. If improvement is not marked in from twenty-four to thirty-six hours intestinal antiseptics, astringents, or both may be administered.—(*Pocket Cyclopedia.*)

OBSTETRICS AND GYNECOLOGY.

1. The *placenta* is a structure on the wall of the pregnant uterus to which the fetus is attached by means of the umbilical cord. Formation is from the chorion and decidua serotina. It supplies the fetus with nourishment, oxygenizes the impure fetal blood, and removes waste products from the fetus.

2. PELVIS. *Bones:* Right and left innominate bones (each consisting of ilium, ischium, and pubis), sacrum, and coccyx. *Straits:* Superior and inferior. *Divisions:* True and false.

3. Anteroposterior diameter is about five inches; the transverse, about four inches; and the diagonal, about four and a half inches.

4. The *anterior fontanelle* is a large quadrilateral membranous space at the junction of the sagittal and coronal sutures. The *posterior fontanelle* is a small triangular membranous space at the junction of the sagittal and lamboidal sutures. In L. O. A. and R. O. A. positions the small posterior fontanelle can be felt.

5. SIGNS OF PREGNANCY: "The *positive signs* cannot usually be detected until after the fourth month, and are three in number: (1) hearing and counting the fetal heart-beat; (2) perception of the active and passive movements of the fetus; and (3) the ability to map out its outlines. The *probable signs* can be appreciated at a much earlier period, and are: (1) changes in the shape and consistency of the body of the uterus; (2) changes in the cervix; (3) the detection of intermittent uterine contractions; and (4) increase in the size of the abdomen and uterus. The *presumptive evidences,* with a few exceptions, are subjective, and may be experienced at varying periods. They are: (1) cessation of the menses; (2) changes in the breasts; (3) morning sickness; (4) quickening; (5) Chadwick's sign; (6) disturbances in urination; (7) abnormalities in pigmentation; (8) abnormal cravings; and (9) mental disturbances."—(Williams.)

6. Exclude meat from the diet; give milk instead; keep bowels open by calomel and salines; give diaphoretics and diuretics.

7. *Endometritis* may be catarrhal, suppurative, ulcerative, gangrenous, cystic, and tuberculous. Such conditions often prevent conception; sometimes they cause absorption of the embryo; sometimes cause abortion.

8. *Abortion* is delivery of the product of conception before the twelfth week.

Miscarriage is delivery of the product of conception between the twelfth and twenty-eighth weeks.

Premature labor is delivery of the fetus between the twenty-eighth week and full term.

9. *Crede's method* is to seize the uterus through the anterior abdominal wall, knead it and rub it until it contracts, and then press it firmly down in the direction of the pelvic axis, while it is still being compressed between the fingers and thumb.

10. After labor the mother wants rest, quiet, sleep, proper nourishment; attention must be given to bowels, bladder, breasts. The duties of the nurse include the above and everything that can conduce to the comfort and welfare of the mother and child.

SURGERY.

1. *Methods of controlling hemorrhage:* Ligation, suture, torsion, pressure, elevation, styptics, cautery, forced flexion, heat, cold, ergot, suprarenal extract.

2. *Tincture of iodine is used in modern surgery:* (1) To cleanse the skin; (2) as an application to infected wounds; (3) to irrigate sinuses.

3. *Fracture of anatomical neck of humerus:* Loss of mobility. Great bruising. Head feels irregular from the axilla. Detached fragment may be felt loose in the capsule. Slight shortening of the arm. Crepitus is difficult to obtain. Impaction drives upper fragment into the lower. Any alteration in shape of shoulder is obscured by swelling.

Fracture of surgical neck: Shoulder itself is unaltered in outline. Depression occurs below the shoulder. Line of the humerus points upwards and inwards to axilla. Crepitus is well marked on rotation. Marked shortening occurs. Upper end of the lower fragment may be felt in axilla.

4. A *carbuncle* is a localized inflammation of the subcutaneous tissue, which goes on to sloughing, and is of a more extensive characted than a boil. Staphylococci are the common exciting cause, while the predisposing causes are lowered vitality from diabetes, albuminuria, or after infective fevers. Inoculation is by autoinfection or directly from the surface. *Signs:* The disease begins as an infiltration of a patch of subcutaneous tissue, which is hard, painful, and tender, and the skin over it is red and hot. The infiltration may extend till it is the size of a dinner-plate, and the inflammation ends in sloughing and suppuration, not only of the subcutaneous tissues, but of small areas of the skin over it, so that openings develop in the skin, and allow of the exit of pus and sloughs. The openings extend, the sloughs separate, and the wound heals by granulation. The back is a common situation. Sometimes the face is affected, and there is then a danger of thrombosis extending to the cavernous sinus and producing pyemia. *Treatment* is very satisfactory if properly carried out. An anesthetic should be given, the slough

thoroughly scraped away, the surface left treated with pure carbolic acid and dressed with antiseptic gauze. The patient should be fed on eggs, milk, cream, meat juice, and brandy. Codeine is necessary in diabetics.—(*Aids to Surgery.*)

5. *Treatment of shock:* Place the patient in the recumbent position, with the head low, apply warmth to the body, administer a stimulant, and give a hot saline infusion; morphine, hypodermically, may be necessary for the relief of pain.

6. CHOLELITHIASIS. *Symptoms:* While the calculus remains free in the gall-bladder usually there are no symptoms. Impaction of the stone in the common duct gives rise to intermittent jaundice, following sharp pain in the right hypochondriac or epigastric region, frequently radiating toward the right scapula, nause, vomiting, sweating, depression, and often intermittent fever (Charcot's intermittent fever). When the stone is impacted in the cystic duct jaundice is less common, but the hepatic colic is severer and dropsy of the gall-bladder may occur. The diagnostic points are the age, sex, history of previous attack, with jaundice and intermittent fever, location of the pain, dark, amber-colored urine, containing bile, and sometimes the finding of the stone in the feces.

Treatment includes the relief of pain by morphine (gr. ¼) and atropin (gr. 1/125), hypodermically, inhalations of chloroform, hot applications and blisters over the seat of pain, and, later, a saline purgative. During the interval the diet should be largely liquid, and drugs such as sodium phosphate, sweet oil, chloroform, piperazin, and mineral waters should be administered. Constipation should be avoided by giving fluid extract of cascara (3½) and glycerin (3½) every night. Lavage and rectal irrigation may be practised. If the attacks become more frequent and severe and medical treatment fails operation is indicated.—(*Pocket Cyclopedia.*)

7. *Colles' fracture* is a fracture of the lower end of the radius; it is generally transverse, and is usually within an inch or an inch and a half of the articular surface. There is a characteristic deformity caused by the lower fragment, and the carpus forming a prominence on the dorsal surface; at the same time there is a projection on the palmar surface just above the wrist, caused by the upper fragment. The hand is abducted and pronated, and the styloid process of the ulna becomes very prominent. It is generally caused by a fall on the outstretched palm. *Treatment:* Disinfection and reduction are effected by grasping the hand by the "shaking hand" grip, extending and adducting the hand and lower fragment. Put on a splint. Massage and passive movement must be started by the end of the first week.

8. *Symptoms of erysipelas:* High fever, red swelling with clear border. *Treatment:* Isolation; painting the part with 40 per cent. ichthyol; antistreptococcic serum; cold antiseptic dressings.

9. *Prostatic abscess* may result from catheter infection, from infection of the bladder or urethra, or from traumatism, but the commonest cause is gonorrhea. There may be one abscess, several abscesses, or multiple abscesses. Pus may break into the rectum, the bladder, or the urethra, or may break externally. A prostatic abscess is manifested by chills, fever, sweats, frequency of micturition, tenderness of the perineum and rectum, and agonizing pain, developing during an attack of acute prostatitis. A finger in the rectum can palpate the swollen gland. It should be opened promptly by a perineal incision.—(De Costa.)

10. *Symptoms of strangulated hernia:* General.—Severe pain comes on suddenly after some effort, at first referred to the umbilicus, and subsequently to the site of the hernia. This is accompanied by some shock. The pulse is weak, and, though slow at first, becomes rapid; the skin is cold and clammy; vomiting occurs, and soon becomes frequent and fecal-smelling. Constipation is complete, though both feces and flatus may be passed at first from the lower bowel. The patient generally becomes exhausted from the vomiting and inability to take food. When gangrene occurs, the temperature becomes subnormal, the pulse very rapid and weak, and the patient dies of toxemia from the general peritonitis which follows gangrene.

Local.—A tumor forms at one of the hernial sites; or more often the patient has been the subject of a hernia, which he now finds to be irreducible, tense, tender, and without impulse on coughing. If allowed to persist the sac and coverings become gangrenous."

Treatment is taxis or operation.—*(Aids to Surgery.)*

SPECIAL PRACTICE.

1. *Symptoms:* "The onset of the affection varies; it may be acute, subacute, or chronic; it is usually sudden, with an attack of mild fever of a remittent type, of a few days' duration, on recovery from which it is noticed that the child is paralyzed. Rarely the paralysis may be preceded by convulsions. The paralysis may affect both arms and both legs, the legs alone, or only one of the four extremities; it may, very rarely, be a hemiplegia. As a rule, however, the leg suffers more frequently than the arm; in paralysis of the leg the muscles below the knee suffer more severely than those above. The bladder and rectum are not affected, or, if so, only temporarily, and anesthesia or numbness cannot be detected. The temperature of the paralyzed limb is low and the part is cyanosed in appear-

ance. After a few days there is a slight improvement in the paralyzed parts, although the muscles show a rapid wasting, which is progressive until all muscular tissue is gone. The reflex movements are impaired or abolished. The electrocontractility by the faradic current is abolished in the paralyzed parts. With the galvanic or constant current the 'treatment of degeneration' are developed."—(Hughes' *Practice of Medicine.*)

2.

EPILEPSY.	HYSTERIA.
1. No apparent cause.	1. Cause, emotional.
2. Sudden and rapid onset.	2. Onset gradual, usually after some mental excitement.
3. Aura generally present.	3. Globus hystericus or palpitation.
4. Consciousness lost.	4. Consciousness generally preserved.
5. Pupils general dilated.	5. Pupils normal.
6. Tongue often bitten.	6. Tongue never bitten.
7. Patient very liable to hurt himself.	7. Patient not liable to hurt himself; may injure others.
8. May be involuntary bladder and bowel discharges.	8. Never.
9. Of short duration.	9. Duration longer.

3. *Otorrhea may be caused by:* Otitis media, with or without complications; abscess or polypus in the external meatus. *Dangers:* Thickening of tympanum, destruction of ossicles, caries of mastoid, facial paralysis, inflammation or abscess of brain or meninges, pyemia, infective thrombosis of lateral sinus or jugular vein.

4. Scarlet fever is the disease in which the ear is most commonly involved. The tympanum is generally first attacked.

5. *Conjunctival diseases due to microorganisms:* Conjunctivitis, ophthalmia neonatorum, pink eye, gonorrheal ophthalmia, diphtheritic conjunctivitis, trachoma.

6. IRITIS. *Four causes*: Rheumatism, syphilis, gout, and gonorrhea. *Subjective symptoms:* Pain, photophobia, lacrymation, interference with vision, and malaise. *Objective symptoms:* The iris is swollen, dull, lacks luster. changes color, is congested; the pupil is contracted, sluggish in action and irregular; circumcorneal injection is present; the contents of the aqueous chamber are turbid, and may show pus, or fibrin, or blood.

7. In *nephritis* the effusion of serum begins in the face and extends downward; or in the upper half of the body. In *cirrhosis of the liver,* in the lower half of the body. In *cardiac diseases,* at the feet and extends upward.

8. In *chlorosis* a blood examination shows marked diminution of hemoglobin, slight diminution of red cells, poikilocytosis, and in severe cases nucleated red cells. The diagnosis is certain. In *appendicitis* leucocytosis is fairly constant, except in the mildest and most severe cases. The blood examination will differentiate this condition from typhoid. It is a valuable help in diagnosis, but there is nothing absolutely certain about it. In *trichinosis* there is a leucocytosis with a pronounced eosinophilia. It is of great diagnostic value.

9. *Laryngysmus stridulus* is a peculiar form of laryngo-respiratory spasm, occurring almost exclusively in rickety children. It is characterized by a sudden holding of the breath for a few seconds; the glottis is then burst open, the air rushing in with a stridulous sound. In severe cases the epiglottis is closed and the respiratory muscles are in a state of spasm. Emotion, constipation, nasal adenoids, etc., are exciting causes.

The *treatment* consists in attempting to excite inspiration reflexly by dashing cold water in the face, fanning, hooking back the epiglottis with the forefinger, etc. Intubation or tracheotomy may be required. Chloral, bromides, and minute doses of opium may be given. During the interval the rachitic condition should receive treatment.

10. NASAL POLYPI. These are of two different origins: (1) Inflammatory, and (2) neoplastic.

1. *Mucous polypi* are merely edematous granulations hanging from the surface of a diseased ethmoid bone, which is affected by rarefying ostitis or caries. They occur in young adults, and cause nasal obstruction, often bilateral. Grow from the middle and superior turbinate bones. They frequently undergo cystic degeneration from the development of cysts in the glands of the mucous membrane covering them. After local removal they recur within a few months.

Treatment: (*a*) Removal by wire snare under cocaine; (*b*) Usually a thorough erasion of the lateral mass of the ethmoid or the opening of a suppurating sinus is required, so as to remove the diseased bone.

2. *Fibrous and sarcomatous polypi.*—Consist in all gradations between fibromata and sarcomata, usually beginning as the former and ending as the latter. Occur in children and adolescents most commonly. Grow from the base of the skull and occupy the nasopharynx. Cause nasal obstruction with sanious discharge. *Pressure signs*

may be: (1) Pushing down the velum palati and causing asphyxia; (2) expanding the nasal cavities and producing a widening of the nasal bridge; (3) pressing the eyeballs outward; (4) extending into the base of the brain. *When they are malignant,* secondary growth may occur in the lymph glands of the neck. In these cases the primary growth is probably a lymphosarcoma of the pharyngeal tonsils.

Treatment is possible only in the early stages. In suitable cases, when the growth has not progressed far: (1) Removal by a snare through the anterior nares; (2) removal through the mouth after splitting the soft palate; (3) removal from the face after turning up the soft parts and enlarging the anterior nares by temporary displacement of the maxillæ.—(Groves' *Synopsis of Surgery.*)

STATE BOARD EXAMINATION QUESTIONS.

Wisconsin Board of Medical Examiners.

PATHOLOGY, HISTOLOGY, BACTERIOLOGY.

1. Name the degenerative or retrogressive processes and describe the microscopic appearances of two of them.
2. Name the causes of infarction and give the pathology of their termination.
3. Give the causes of arteriosclerosis and the pathological histology of same.
4. How many and what are the varieties of cirrhosis of the liver?

Give etiology of each, and describe the pathological histology of one variety.

5. Give etiology of tuberculosis, discuss sources of contagion and route of entrance to the tissues of the body. Describe a typical tubercle.
6. Give causes of endocarditis and describe the pathological histology of endocardial vegetations.
7. Name the organs of the body most prone to cancer in order of the frequency of their involvement. Classify the tumors of epithelial origin.
8. What is anemia? Give varieties, differentiate lymphatic leukemia and splenomedullary leukemia.
9. What diseases due to bacteria show a bacteriemia? Give the pathology of typhoid fever.
10. How would you prove that bacteria cause disease.
11. Give the normal histology of the skin.
12. Give the normal histology of a nerve, a muscle, an artery.

ANATOMY.

1. Describe the fifth cranial nerve.
2. Describe the femoral vein.

3. Describe the spleen.
4. Describe the fourth ventricle, and where is it located?
5. Give the boundaries of the axillary space, and name its contents.
6. Describe the abdomen, and name its contents.
7. Describe the pancreas.
8. Describe the biceps and triceps muscles.

PEDIATRICS.

1. Differentiate spasmodic laryngitis and membranous croup, and give treatment of the latter.
2. Give three causes of convulsions in children, and treatment.
3. Describe fully the general management of a case of scarlet fever.
4. Differentiate catarrhal from lobar pneumonia.

PRINCIPLES AND PRACTICE.

1. Give the diagnosis of typhoid fever.
2. Name six organic diseases of the heart and give the physical signs in three of them.
3. Give the treatment of acute and chronic bronchitis.
4. Give the diagnosis and treatment of enterocolitis in children.
5. Give differential diagnosis of smallpox and chickenpox.
6. Give diagnosis of tabes dorsalis.
7. What are the complications of acute articular rheumatism and what are the best means of preventing them?
8. Give diagnosis and treatment of acute lobar pneumonia in the first stage.

MATERIA MEDICA AND THERAPEUTICS.

1. Give physiological actions and uses of strychnine.
2. Name five preparations of mercury with the doses of each.
3. Give the physiological actions of ergot.
4. Give treatment of poisoning by carbolic acid.
5. What do you consider the safest general anesthetic and what is your method of its administration?
6. Give the first signs of danger in giving a general anesthetic?
7. Give means of resuscitation in threatened death from anesthesia.

PHYSIOLOGY, OPHTHALMOLOGY AND LARYNGOLOGY.

1. Describe the nervous mechanism of muscular contraction.
2. What is food? Classify and give functions.

3. Differentiate between serous, mucous, and synovial membranes. Tell where each is found.
4. How is asphyxia produced? What are the causes of death from asphyxia?
5. Describe the physiology of hearing.
6. Name the organs of elimination and tell what is eliminated by each.
7. Give the distribution and function of the third and fifth cranial nerves.
8. Define respiration, its purpose and how accomplished. Define a reflex arc.
9. Give cause, diagnosis and treatment of corneal ulcer.
10. What is choked disc? Give most important cause and treatment.
11. Diagnose and give treatment for foreign bodies in the larynx.
12. Give etiology and diagnosis of atrophic rhinitis. How is it cured?

OBSTETRICS.

1. At what time during pregnancy is an abortion most dangerous? Describe the management of such a case.
2. Give etiology and treatment of pernicious vomiting of pregnancy.
3. What symptoms during pregnancy would cause you to fear postpartum hemorrhage, and what treatment would you use to prevent its occurrence?
4. What treatment would you use to prevent toxemia of pregnancy?
5. Give diagnosis and management of breech presentation and cause of fetal mortality incident to same.
6. What are the indications for the use of forceps? Give rule for applying them.
7. If the conditions were such that you feared laceration of the cervix, what means would you use to prevent the same?
8. State fully your treatment of puerperal convulsions during and after labor.

GYNECOLOGY.

1. Give symptoms and treatment of cervical endometritis.
2. Name the ligaments that hold the uterus in position and give attachments of same.
3. Name the number of and different places at which a pelvic abscess may "point."
4. Give general outline of treatment for disturbances and disorders incident to the menepaus.

SURGERY.

1. Name and define the three most important principles of practice in present-day surgery.

2. Name and define anesthetics in the order of frequency used, and give contraindications for use of each.
3. Give diagnosis and treatment of a ruptured male urethra.
4. Give indications for tracheotomy in the order of frequency required, and define the operation.
5. Give diagnosis and treatment of a ruptured appendix vermiformis.
6. Give diagnosis and treatment of a cholecystitis with obstruction.
7. Give treatment for fracture of both bones of the forearm at or near their middle.
8. Give treatment for dislocation of outer end of clavicle.

PHYSICAL DIAGNOSIS.

1. Give the physical signs of lobular pneumonia.
2. Give physical signs of empyema of chest.
3. Give physical signs of cardiac dilatation.

HYGIENE.

1. Give amount of fresh air space necessary to each individual in the sick room.
2. Give amount of excrement exhaled from lungs and excreted from the skin in twenty-four hours and the best methods of disposal.

NEUROLOGY, MEDICAL JURISPRUDENCE AND DIETETICS.

1. Name all the nerves that would be severed in an amputation of the arm, at the junction of the middle with the upper third.
2. Give origin, distribution and function of any one of the cranial nerves, and name its foramen of exit from the skull.
3. Name and locate the principal parts of the primary divisions of the cerebro-spinal nervous system.
4. (a) What is the "Romberg symptom?"
(b) Name and describe the various stages of the disease in which it occurs.
5. Give the nerve supply of the stomach, liver, spleen, and diaphragm.
6. In a case of supposed infanticide, what post-mortem signs would determine whether the babe was born dead or alive?
7. Can a physician be held liable to a charity patient, in case malpractice is proven against him?
8. Can a master, who calls a physician to attend to a servant in his employ, be held for the physician's fee?
9. What is the advantage of toast over ordinary bread in certain gastric disturbances?
10. What constitutes good drinking water?

11. At about what age would you begin to feed a child farinaceous foods? nitrogenous foods?

12. Name the foods which may be permitted, and those which should be forbidden in the treatment of diabetes mellitus.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

Wisconsin Board of Medical Examiners.

PATHOLOGY, HISTOLOGY, BACTERIOLOGY.

1. The *degenerative or retrogressive processes* are: Atrophy, cloudy swelling, fatty degeneration, fatty infiltration, albuminoid degeneration, amyloid degeneration, hyaline degeneration, mucoid degeneration, colloid degeneration, glycogenic infiltration, dropsical infiltration, calcification, ossification, necrosis, pigmentation, gangrene, and inflammation.

2. *Causes of infarction:* Plugging up of end arteries; occlusion of a number of adjoining arteries and capillaries; thrombosis; swelling of the parenchymatous cells of the organ compressing the vessels. *Subsequent changes:* "In anemic infarcts coagulation-necrosis and caseation are the marked degenerative changes. The broken-down tissue is gradually absorbed and reactive inflammation and organization cause cicatrization. Not infrequently a small amount of calcareous matter is deposited, especially in infarcts of the lungs. In hemorrhagic infarcts the extravasated blood breaks up into pigment-matter and the tissues suffer degenerations similar to those seen in anemic infarcts. The final result in either case is generally a scar, which is pigmented in cases of hemorrhagic infarcts. More rarely infarcts undergo liquefaction and cyst-formation, especially in the brain. The infarct may become infected by micro-organisms after its formation and abscess may result, as in cases in which the embolus itself was an infectious one."—(Stengel's *Pathology.*)

3. *Causes of arteriosclerosis:* Age, male sex, heredity, high living, alcohol, syphilis, uric acid, nephritis, tuberculosis, rheumatism, diabetes.

The large arteries are chiefly affected. The earliest changes are a small-celled infiltration of the subendothelial tissue, which may be either replaced by fibroid tissue or undergo fatty degeneration.

Degeneration usually occurs, and the softened mass either bursts into the artery or becomes converted into a calcareous plate. The process extends to the middle coat, which is at first softened, and the muscular tissue is destroyed in patches. The result is either weakening of the

wall and dilatation into an aneurism, or the deposit of lime salts and calcification of the middle coat. The external coat is thickened, and helps to prevent dilatation. The conditions which are secondary to atheroma are thrombosis, detachment of a plate forming an embolus, or "dissecting aneurism," due to the blood-stream getting under a plate and tunnelling under the tunica intima.

4. *Atrophic cirrhosis, hypertrophic cirrhosis, and biliary cirrhosis. In atrophic cirrhosis* the liver is shrunken and indurated, tough, and of a pale or yellow color; a growth of new connective tissue is disposed in broad bands which run in various directions, and by their contraction divide the liver into numerous irregular lobes. Many acini may be affected at one time. The capsule may be thickened, or adherent to the diaphragm. Jaundice is slight, and comes on late; ascites is pronounced and may occur early.

5. The tubercle bacillus is the cause of tuberculosis. Sources of contagion are expired air of those infected, dust, clothes, etc., of those infected. Enters the body generally through the respiratory tract, but can enter through alimentary canal or cut skin. A tubercle is a nodule; it may be divided into three zones, according to its histologic characteristics: (1) A *central* zone containing bacteria and tissue cells that have undergone coagulation necrosis. (2) A *medium* zone, in which are many epithelioid cells and frequently giant cells containing vesicular nulei arranged peripherally and radially. (3) A *peripheral* zone, in which are found a few epithelioid, many lymphoid cells, and some plasma cells.

The giant cells as well as the epithelioid may come from the endothelium of the blood-vessels or lymph-vessels, from fibroblasts or from escaped leukocytes.

6. ACUTE ENDOCARDITIS. *Etiology:* Microorganisms (chiefly *Staphylococcus pyogenes aureus, Streptococcus pyogenes, Diplococcus pneumoniæ,* gonococcus, and others); acute articular rheumatism, pneumonia, scarlet fever, puerperal sepsis, nephritis, etc., are said to be etiological factors. *Pathology:* The valves (mitral, aortic, and pulmonary), and endocardium of ventricles and left auricle are chiefly involved. The valves are affected on a line very near to the free edge; the chordæ tendineæ also suffer, and the endocardium of the left ventricle, near the septum. Opacity, roughness, nodular elevations, fibrous deposit, ulceration have all been observed. *Results:* Calcification, destruction of chordæ tendineæ or valve, myocarditis pericarditis, embolism, infarcts or metastatic abscesses in spleen, brain, or kidneys.

7. *Scirrhous carcinoma* occurs in: Female breast, stomach, esophagus, bladder, rectum, and skin. *Colloid carcinoma* in: Stomach, intestines, and female breast. *Cylin-*

drical celled carcinoma, in: Rectum, uterus, bladder, superior maxilla, and stomach.

EPITHELIAL TUMORS are: (*a*) *Benign*: Adenoma and papilloma; (*b*) *Malignant:* Epithelioma, rodent ulcer and carcinoma.

8. *Anemia* is a condition characterized by a diminution in the number of red-blood cells, or of hemoglobin, or of both.

Varieties: (1) Local.

(2) General { Primary { Chlorosis. / Pernicious anemia. / Secondary }

In *lymphatic leukemia,* there is a leucocytosis in which the lymphocytes predominate; there may be a new myelocytes. Lymphatic glands are enlarged. In *splenomedullary leukemia,* there are many myelocytes, large leukocytosis; nucleated red cells are present, and the spleen is enormously enlarged.

9. *Bacteriemia* is found in: Pneumonia, typhoid, anthrax, pyemia, gonorrhea, syphilis.

Pathology of typhoid fever: "Principally inflammation of the lymphoid tissue of the lower portion of the ileum, with more or less catarrh throughout the bowels. Peyer's Patches—1st week.—Are swollen through infiltration of leucocytes, the surfaces raised and fawn-colored—the infiltration involves the submucous coat. The lesions are most numerous at the lower end of the ileum. 2nd week.—The surface becomes abraded; sloughs form, which are often bile-stained. 3rd week.—Sloughs come away, leaving ulcerating surfaces. Typical typhoid ulcers are thus formed. A few solitary glands undergo the same process. At the end of the week the ulcers begin to granulate, but healing is usually slow.

"Mesenteric glands may undergo the same changes, but more often become swollen, red, and tender only, or break down into cheesy masses. Other organs.—Spleen and liver are enlarged; heart is soft and flabby. The voluntary muscles undergo granular degeneration; in fact, similar changes to those found after death from high temperature."—(Wheeler and Jack.)

10. To *prove that bacteria cause disease* it is essential: (1) That the microorganism be found in the tissues, blood, or secretions of a person or animal sick or dead of the disease; (2) the microorganism must be isolated and cultivated from these same sources; it must also be grown for several generations in artificial culture media; (3) the pure cultures, when thus obtained, must, on inoculation into a healthy and susceptible animal, produce the diseases in question, and (4) the same microorganisms must again be found in the tissues, blood, or secretions of the inoculated animal.

11. Skin consists of *epidermis*, made up of stratum corneum, stratum lucidum, stratum granulosum; and *derma*, composed of stratum reticulare and stratum papillare.

12. An *artery* consists of three coats: The tunica interna, or internal coat; the tunica media, or middle coat, and the tunica adventitia, or external coat. The internal coat consists of a basement membrane, on which is a layer of endothelial cells. The middle coat consists of involuntary muscle fibers, between the layers of which are some elastic fibers. The external coat consists of connective tissue (white fibrous and yellow elastic). Between the two outer coats is an elastic membrane.

Muscle:

CHARACTERISTIC.	VOLUNTARY STRIATED.	SMOOTH.	CARDIAC.
Shape.	Long cylinder.	Spindle.	Stubby cylinder.
Nucleus.			
Number.	Many.	One.	One.
Location.	Peripheral.	Central.	Central.
Shape.	Intermediate.	Rod.	Oval.
Striations.	Cross and long.	None.	Cross and long.
Sarcolemma.	Present.	None.	None.
Branches.	Occasional.	None.	Always.

A *nerve* is a collection of nerve fibres arranged in a definite manner. Each *nerve* is surrounded by a sheath of white fibrous tissue, the *epineurium*. From this, septa pass inward and divide the nerve into large *secondary bundles* that are further subdivided into *primary bundles*, or *fasciculi*, each of which is surrounded by the *perineurium*. The fibres contained in the fasciculi are separated from one another by the *endoneurium*, which is a continuation of the perineurium.

The *blood-vessels* pierce the epineurium and branches are sent along the septa into the primary bundles. Here capillaries are formed, which run parallel to the fibres. These vessels are the vasa nervorum.

ANATOMY.

1. *Fifth cranial nerve.—Superficial origin:* From the side of the pons Varolii. *Deep* (sensory root), from the medulla and upper part of cord; (motor root) from floor of fourth ventricle and side of the aqueduct of Sylvius. *Exit:* The ophthalmic division, through the sphenoidal fissure; the superior maxillary division, through the foramen rotundum; the inferior maxillary division, through the foramen ovale. *Ophthalmic branch* distributed to conjunctiva, skin of upper eyelid, cornea, skin of forehead, and nose, lacrymal gland. *Superior maxillary*, to skin and con-

junctiva of lower eyelid, nose, cheek, upper lip, upper teeth, and palate. *Inferior maxillary,* to external auditory meatus, side of head, mucous membrane of mouth, anterior two-thirds of tongue, lower teeth, and skin of lower part of face. Also to muscles as indicated under *Function.* It supplies sensation to all the parts mentioned above; but, in addition, inferior maxillary supplies motion to the muscles of mastication, the mylohyoid, and anterior belly of the digastric.

2. *Femoral vein* accompanies the femoral artery through upper two-thirds of thigh; in lower part of its course it is external to the artery, higher up it is behind it, and at Poupart's ligament it is internal to the artery. It becomes the external iliac vein.

3. The *spleen* is situated in the back part of the left hypochondriac and epigastric regions, being covered by the ninth, tenth, and eleventh ribs, on the left side. It is of an oblong, flattened form, the external surface being convex; on the inner surface is a vertical ridge dividing it into two parts, the posterior of which is applied to the outer surface of the left kidney, while the anterior one receives the tail of the pancreas, and lies against the cardiac end of the stomach. Near this ridge is a fissure, *the hilum,* where the vessels enter. The anterior border is notched, and the lower end is pointed and rests on the costocolic ligament, situated in the left hypochondriac region. It is covered by peritoneum, except at the hilum, where it passes forward and inward in a double line enclosing the vessels, as the gastrosplenic omentum, to the fundus of the stomach. It usually measures 5 by 3 by 1 or 1½ inches, and weighs about 7 ounces.—(From *Aids to Anatomy.*)

4. The fourth ventricle is the expanded portion of the central canal of the spinal cord; it is a diamond-shaped cavity situated between the cerebellum behind, and the posterior surface of the pons and medulla in front. It is bounded: *Above,* by the valve of Vieussens and the cerebellum. *Below,* by the pons and medulla. *Laterally,* by the superior peduncles of the cerebellum, restiform bodies.

5. The axillary space is *bounded: Anteriorly,* by the clavicle, Subclavius, Pectoralis major, costocoracoid membrane, Pectoralis minor; *posteriorly,* by the Subscapularis, Teres major, and Latissimus dorsi; *internally,* by the first four ribs, first three Intercostal muscles, Serratus magnus; *externally,* by the humerus, Coracobrachialis, and Biceps.

Contents: The axillary vessels and brachial plexus of nerves, with their branches, some branches of the intercostal nerves, and a large number of lymphatic glands, all connected together by a quantity of fat and loose areolar tissue.

6. The regions of the abdomen and their contents are shown in the following table. It is to be remembered that the contents will vary according to the position of the lines drawn; these are arbitrary, and nearly every writer differs from every other. In the following table the superior horizontal line extends between the cartilaginous ends of the tenth ribs, the inferior between the anterior superior iliac spines. The vertical lines pass upward from the ilio-pectineal eminences, at right angles, to the upper horizontal line.

The viscera situated in each region are as follows:

RIGHT HYPOCHONDRIAC.	EPIGASTRIUM.	LEFT HYPOCHONDRIAC.
Liver. Right kidney. Hepatic flexure. Colon.	Liver. Stomach. Gall-bladder. Duodenum. Pancreas.	Stomach. Spleen. Left kidney. Splenic flexure. Colon.
RIGHT LUMBAR.	**UMBILICAL.**	**LEFT LUMBAR.**
Right kidney. Ascending colon. Ileum.	Transverse colon. Duodenum and small intestines. Great omentum.	Small part of left kidney. Descending colon. Small intestines.
RIGHT ILIAC.	**HYPOGASTRIC.**	**LEFT ILIAC.**
Cecum. Appendix. Last coil of ileum.	Small intestines. Bladder in children. Distended bladder in adults. Pregnant uterus. Sigmoid colon.	Sigmoid colon. Small intestines.

7. The *pancreas* lies transversely across the posterior abdominal wall, the large vessels intervening between it and the wall—being on a level with the second lumbar vertebra (and sometimes with the first or third)—lying in the epigastric and left hypochondriac regions—having the stomach in front, duodenum to the right, and spleen to the left—and the aorta, vena cava, celiac plexus, thoracic duct, and diaphragmatic crura behind. It lies behind the posterior wall of the lesser omental cavity and is between the laminæ of the mesocolon of the transverse colon. The head of the pancreas is surrounded by the loop of the duodenum. The tail of the pancreas is in contact with the interno-inferior aspect of the spleen. Peritoneum covers the pancreas except upon its posterior surface. The viscus is about 6 inches in length, 1¼ to 1½ inches in

width, and about ½ inch in thickness.—(Bickham's *Operative Surgery.*)

8. *Biceps. Origin:* Glenoid cavity and coracoid process of scapula. *Insertion:* Tuberosity of radius. *Action:* It flexes the elbow and forearm.

Triceps.—Origin: The long, or middle, head arises from a depression of the axillary border of the scapula immediately below the glenoid cavity; the external head from the root of the great tuberosity on the posterior surface of the humerus, and the upper part of the musculospiral groove; the internal head from the posterior surface of shaft of humerus, below musculospiral groove, and the internal and external muscular septa. It is *inserted* into the back part of the upper surface of the olecranon process of the ulna. *Action:* It extends the elbow and forearm.

PEDIATRICS.

1. *Membranous croup* is laryngeal diphtheria, and the membrane is *in,* not *on,* the mucous surface; it is not easily removed, bleeds when removed, and contains the bacilli of diphtheria. In *spasmodic laryngitis,* none of the above will be found, and it generally comes on suddenly in the middle of the night; the child gasps for breath, is hoarse, coughs, is cyanotic, but the attack is soon over. *Treatment* of the latter is inhalation of steam, an emetic, a hot mustard bath, and syrup of ipecac.

2. *Three causes of convulsions in children:* Overeating, high fever at the beginning of an infectious disease, and meningitis. *Treatment:* Inhalation of a few drops of chloroform; irrigation of intestine, chloral (5 grains) by enema; the child should be kept in a quiet room; a hot mustard pack may be given.

3. *Treatment of scarlet fever:* This "consists first in isolation until desquamation has been completed. The patient should be placed in bed and liquid diet should be prescribed. The room should be well ventilated and all unnecessary furnishings should be removed. A sheet wet with some antiseptic solution should be hung over the doorway, and attendants should be covered with long gowns to prevent carrying the infection in their clothing. Careful disinfection of the hands, face and hair is absolutely necessary on the part of the physician, nurse, and other attendants. The throat and nose should be cleansed by some alkaline or antiseptic solution, such as Dobell's, peroxide of hydrogen, or soda bicarbonate solution. The throat symptoms may be relieved by the inhalation of vapor containing eucalyptus oil, turpentine, etc. The gastrointestinal disturbance will require the use of calomel, and the vomiting may be controlled by small pieces of cracked ice, paregoric (gtt., 1-5), or cocain (gr. ⅟₂₀). (Acetanilid (gr.

½ for each year of age), phenacetin, or quinine (gr. ½-1) will relieve the nervous symptoms. If the pulse becomes weak and the heart irregular, stimulants, such as aromatic spirits of ammonia (gtt. 10), brandy or whisky (gtt. 10), strychnine (gr. 1/100-1/80), nitroglycerine (gr. 1/600-1/100), etc., are indicated. Daily sponging with antiseptic solution and inunctions with cacao-butter are very beneficial."—(*Pocket Cyclopedia.*)

4.

LOBAR PNEUMONIA.	CATARRHAL PNEUMONIA.
Generally a primary disease.	Generally secondary (to bronchitis or an infectious disease).
Age has little influence.	Generally found in very young or very old.
Sudden onset.	Gradual onset.
Fever is high and regular.	Fever is not so high, and is irregular.
Ends by crisis between sixth and tenth day.	Ends by lysis, at no particular date.
Generally only one lung affected.	Generally both lungs affected.
The physical signs are distinct; and there is a large area of consolidation.	Physical signs indistinct; and the evidences of consolidation are indefinite.
Sputum is rusty.	Sputum is rather streaked with blood.

PRINCIPLES AND PRACTICE.

1. *Symptoms:* Insidious onset, weakness, headache, epistaxis, vague pains. The temperature rises gradually, about 2° in the evening, and falling 1° in the morning. Diarrhea, tenderness in the right iliac fossa, enlarged spleen, and a characteristic rash which appears from seventh to twelfth day. During the second week the temperature remains at a uniform level; typhoid state and delirium may be present. The pulse becomes rapid, weak, and dicrotic; the heart sounds are feeble; the tongue is coated, fissured, and tremulous; sordes appear on the teeth; the abdomen is distended; the stools are yellowish and offensive (said to be like pea soup); the Widal reaction may be positive. In the fourth week the temperature becomes normal.

2. Mitral regurgitation, mitral stenosis, aortic regurgitation, aortic stenosis, tricuspid regurgitation, tricuspid stenosis.

In *mitral regurgitation*, the apex beat is displaced downward and outward, a loud blowing systolic murmur is heard at the apex and is transmitted to axilla or back. The second pulmonic sound is accentuated. In *mitral stenosis* there is a presystolic thrill at the apex, and a rough presystolic murmur is heard at the apex; it is not transmitted. *Aortic stenosis* gives great displacement of apex, and at the base of the heart is a systolic murmur, transmitted to the vessels of the neck. The pulse is of small volume.

3. *Acute bronchitis:* "If the bowels are constipated or the tongue is coated, a purgative should be given at once. Free diaphoresis may be established by the use of hot foot-baths and hot lemonade on going to bed. The atmosphere of the room should be maintained at an even temperature —never below 65° F. or 70° F.—and a flannel jacket should be worn; mustard plasters may be applied to the chest. The diet should be liquid. Quinine (gr. 4) with Dover's powder (gr. 10) every three or four hours are indicated. Opium and its derivatives relieve the distressing cough. Codein disturbs the stomach less than morphine. Heroin is also used.

Chronic bronchitis: "Avoid undue exposure to cold and wet and irritating vapors. The proper observance of personal hygiene is important. If organic disease is causative, the appropriate treatment should be instituted. If the health is not good, tonics, such as the syrup of hypophosphites (3ʒ) or the elixir phosphate of iron, quinine, and strychnine (3ʒ) taken after meals. A change of climate may be beneficial. Emulsion of codl-iver oil alone or combined with beechwood creosote (*m* 2-4) is often of great value. Carbonate of ammonium may be given, but its constant administration may impair digestion."—(*Pocket Cyclopedia.*)

4. *Enterocolitis:* "The disease may begin as dyspeptic diarrhea, also as cholera infantum. There is elevation of temperature (104° F.), sometimes vomiting, decided abdominal pain, tense, swollen abdomen, and diarrhea. The stools vary from 15 to 30 or more in the 24 hours, are small in quantity, and contain mucus and sometimes blood. The disease may soon abate and convalescence be established, or the symptoms may increase in severity. The stools may become fetid. The urine is scanty, of high specific gravity, and contains urates. Emaciation, exhaustion, convulsions, and death may ensue. The condition may be distinguished by the high fever, large amount of mucus in the stools, pain, and decline. The prognosis is unfavorable, although recovery is not infrequent after a long illness. *Treatment:* The general hygienic and dietetic treatment is similar to that of acute dyspeptic diarrhea.

Anodynes are necessary. Depletion by the judicious administration of the salines in the beginning is recommended. The colon should be irrigated with cold or iced water, 1 per cent. salt solution, nitrate of silver solution (gr. 1-℥i), or tannic acid solution (gr. 5-℥i)."—*(Pocket Cyclopedia.)*

5. *Varicella* is chickenpox; *variola* is smallpox.

(1) Very young children are attacked with varicella, whereas variola usually shows itself in adults. (2) Vaccinated children readily take varicella; not so variola, even in the modified form. (3) Children who have had varicella may contract variola, even soon afterward; or the two diseases may coexist. (4) Varicella is not inoculable, whereas variola is notoriously so. (5) The eruption of varicella appears in twenty-four hours; that of variola not till the third day. (6) The febrile symptoms continue after the eruption appears in varicella; those of variola subside. (7) In varicella the spots come out in successive crops; this is never seen in variola. (8) The spots in varicella are unilocular, and collapse on being punctured; the spots in variola are multilocular, and do not collapse on being punctured. (9) In varicella the eruption is very irregular, and appears over the body generally; in variola it appears in groups of threes and fives, and is always seen on the limbs. (10) The papule in varicella is soft, and disappears on stretching the skin; in variola it is hard and shotty, and does not disappear on stretching the skin.

6. *Tabes dorsalis* is diagnosed by the motor incoordination, staggering gait, shooting pains, inability to walk with the eyes closed, absence of knee-jerks, and the presence of the Argyll-Robertson pupil.

7. The chief *complications* are: Hyperpyrexia, endocarditis, pericarditis, myocarditis, pneumonia, chorea, and coma. Patient should be put to bed, in flannel night dress, between blankets; milk should be given plentifully; thirst may be quenched by barley water or lemonade, broths and soups may be given; salicylates are indicated; blisters along the course of the 3d to 6th intercostal nerves are said to prevent endocarditis.

8. In the *first stage of lobar pneumonia,* there are deficient breathing, vocal fremitis increased, percussion note impaired or hollow, and vesicular murmurs with crepitant râles are heard. There are present chill, high fever, rapid pulse, short, rapid respiration, pain over chest. *Treatment:* Rest in bed; the room should be well ventilated, nutritious diet, cotton jacket to chest; calomel purge, Dover's powder, and aconite are all useful.

MATERIA MEDICA AND THERAPEUTICS.

1. STRYCHNINE. *Action:* Strychnine is a bitter tonic,

stimulates appetite, secretion, and digestion, increases peristalsis, stimulates the vasomotor centers, and so raises arterial tension; it stimulates both accelerator and inhibitory nerves of the heart. All the functions of the spinal cord are exalted by strychnine, reflex, motor, vasomotor, and sensory. Large doses cause dilated pupils, irregular and jerky respiration, increased reflexes. *Therapeutic uses:* For indigestion, intestinal torpor, heart disease, pneumonia, amenorrhea, dysmenorrhea, paralysis, impotence, and as a cardiac and respiratory stimulant.

2. Hydrargyrum cum creta, gr. iv; massa hydrargyri, gr. iv; hydrargyri chloridum mite, gr. j; liquor arseni et hydrargyri iodidi, ℥jss; hydrargyri chloridum corrosivum, gr. 1/20.

3. ERGOT. *Physiological action:* Ergot stimulates and causes contraction of involuntary muscle fibers, hence it is a vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative, it raises the blood pressure, it increases peristalsis, and is an emmenagogue.

4. Give any soluble sulphate, such as sodium sulphate, or alcohol. The stomach may be washed out with equal parts of alcohol and water, and about half a pint of the same mixture may be left in the stomach.

5. The safest general anesthetic is, undoubtedly, nitrous oxide.

Administration of nitrous oxide gas "requires a mouthpiece or face-piece, which should fit accurately and tightly all the coutour of its application. The aim should be to exchange all the air in the air passages for the gas. Air may be admitted at every fourth or fifth respiration, since the continuance of the gas without air will bring on convulsive movements. Anesthesia by this agent, therefore, is not adapted to operations lasting longer than two or three minutes and requiring steadiness for their proper performance.'—(Gould and Pyle's *Pocket Cyclopedia.*)

6 and 7. Failing respiration, or failing circulation; cyanosis.

Treatment of Syncope: "Stop the administration of the anesthetic. Remove the pillow from beneath the patient's head, seize the tongue with the forceps, and draw it forward; compress the sternum forcibly, allowing the chest of its own elasticity to expand; do not wait for the respiration to cease before doing this. At the same time let one of the assistants administer a hypodermic injection of *m* 1- of tincture of digitalis. If the symptoms of heart failure continue, give another hypodermic of aqua ammonia, *m* 5; whisky, *m* 20. If there are symptoms of failure of respiration, administer hypodermically gr. 1/60 of atropine or strychnine. If, after two or three compressions, there is any improvement, continue the treatment; place one hand

on the back and the other on the sternum, and keep up the respiration by pressure, having previously suspended the patient by his legs, with his head downward. Rectal or intravenous injections of a normal saline solution at a temperature of 105° F. may be demanded."—(Gould and Pyle's *Pocket Cyclopedia.*)

PHYSIOLOGY, OPHTHALMOLOGY, AND LARYNGOLOGY.

1. The impulse causing ordinary muscular contractions originates in the centers of the brain or spinal cord, and then travels by the nerves going to the particular muscles. As such nerve enters a muscle it breaks up into a number of branches, which are distributed to all parts of the muscle. The terminal ends of the nerve are scattered in great numbers throughout the muscle, and the impulse carried by the nerve is transmitted by the end plates to the various muscle fibers. Sometimes the muscular contraction may be reflex. (See below, Question 8.)

2. *Food* is material which, after being taken into the body, is capable of building up the body, of repairing tissue waste, and of supplying heat and energy. *Foods are classified* as:

I. Inorganic..	Water	
	Salts.	
II. Organic....	Nitrogenous—Proteids.	Carbohydrates.
	Non-Nitrogenous.	Fats.

Function of proteids: Formation and repair of tissues and fluids of the body, regulation of the absorption and utilization of oxygen, formation of fats and carbohydrates, production of energy. *Function of carbohydrates:* Production of heat and energy and formation of fats. *Function of fats:* Supply of heat and energy, supply of fatty tissues, nutrition of nervous system. *Function of salts:* Support of bony skeleton, supply of HCl for digestion, regulation of nutrition and energy. *Function of water:* It enters into the composition of all the tissues and fluids of the body, it moistens the surfaces and membranes of the body, it keeps the fluids of the body at their proper degree of dilution, it removes waste matters, distributes and regulates body heat.

3. *Mucous membrane* lines those parts which communicate with the exterior of the body; it contains glands, basement membrane, connective tissue support, blood and nerve supply, and epithelium. *Found* in digestive, respiratory, and genitourinary tracts.

Serous membrane lines closed cavities (except peritoneum in the female); it contains a basement membrane and endothelial cells, but no glands. *Examples:* Pericardium, pleura, peritoneum, tunica vaginalis of testis, and meninges.

Synovial membrane is in connection with joint and ten-

dons, and has no glands, but a basement membrane with connective tissue cells.

4. Asphyxia is suffocation, due to depriving the lungs of oxygen. It is caused by preventing oxygen from reaching he lungs; by obstruction of the respiratory passages; by inhaling a gas without oxygen, or one which strongly tends to displace oxygen from the hemoglobin, as carbon monoxide; or by interfering with the change of gases which should take place between the air and the blood.

The cause of death in asphyxia is: Paralysis of the respiratory center in the medulla.

5. "The waves of sound are gathered together by the pinna and external auditory meatus, and conveyed to the membrana tympani. This membrane, made tense or lax by the action of the tensor tympani and laxator tympani muscles, is enabled to receive sound waves of either high or low pitch. The vibrations are conducted across the middle ear by a chain of bones to the foramen ovale, and by the column of air of the tympanum to the foramen rotundum, which is closed by the second membrana tympani, the pressure of the air in the tympanum being regulated by the Eustachian tube. The internal ear finally receives the vibrations, which excite vibrations successively in the perilymph, the walls of the membranous labyrinth, the endolymph, and, lastly, the terminal filaments of the auditory nerve, by which they are conveyed to the brain."—(Brubaker's *Physiology.*)

6. The *organs of elimination*, are: (1) The *skin*, which eliminates water and a slight quantity of carbon dioxide, urea, and salts; (2) the *lungs*, which eliminate water, carbon dioxide; (3) the *intestines*, which eliminate the indigestible and unabsorbed substances from the food, with secretions from liver and pancreas; (4) the *kidneys*, which eliminate water, urea, other nitrogenous matter, and salts.

7. The third cranial nerve is the motor nerve to all the muscles of the orbit except the Superior oblique and the External rectus. Hence, it supplies the Rectus superior, Rectus inferior, Rectus internus, Inferior oblique, and Levator palpebræ superioris. It also (through the ciliary ganglion) supplies the sphincter muscle of the iris, and the ciliary muscle.

THE FUNCTIONS OF THE FIFTH CRANIAL NERGE. *First ophthalmic branch* supplies sensation to conjunctiva and skin of upper eyelid, cornea, skin of forehead and nose, lachrymal glands, mucous membrane of nose. *Second, or superior, maxillary branch* supplies sensation to skin and conjunctiva of lower lid, nose, cheek, upper lip, upper teeth and alveolar processes, and palate. *Third, or inferior, maxillary branch* supplies sensation to external auditory meatus, side of head, mucous membrane of mouth, an-

terior two-thirds of tongue, lower teeth, lower lip, and skin of the lower part of the face. This branch, in addition, supplies motion to the muscles of mastication (Masseter, Temporal, External, Pterygoid, Internal Pterygoid), also mylohyoid and anterior belly of digastric.

8. Respiration is the act of breathing; in includes both inspiration and expiration. Its purpose is to introduce oxygen into the system and to excrete carbon dioxide. And see Cunningham's "Anatomy" (1909), page 419.

Reflex actions are involuntary or unconscious movements, due to suitable stimuli. They depend upon the integrity of the *reflex arc*, which is a complex made up of: (1) A surface capable of receiving an impression; (2) an afferent nerve; (3) a nerve cell capable of receiving and also of sending out impulses; (4) an efferent nerve and (5) a surface capable of responding in some way to the impulse conveyed by the efferent nerve.

9. "*Corneal ulcer* results from traumatism or extension of inflammation from some adjoining tissue. It is detected by oblique illumination, the ophthalmoscope, or convex lens, and by dropping fluorescin upon the cornea, the denuded area being colored green. Pain, photophobia, lacrimation, swelling of the lids and conjunctiva, and destruction of tissue are symptoms. Corneal opacities, staphyloma, perforation, adherent leukoma, atrophy of the eyeball, and prolapse of the lens and vitreous may result. The treatment consists in putting the eye at rest, instilling atropine, and the application of a bandage. Leeches to the temple will relieve the pain. Hot compresses have the same effect. The eye should be douched with sublimate solution, 1:5000, and iodoform dusted upon the cornea. Stronger sublimate solution, boroglycerid 50% and formalin 10%, are sometimes necessary. Cauterization is occasionally indicated. If perforation seems probable it should be hastened by a puncture." (Gould and Pyle's *Pocket Cyclopedia.*)

10. *Choked disc* is a condition in which the optic papilla is swollen, congested, and inflamed; it is due to increased intracranial pressure.

It occurs in brain tumors, tuberculous meningitis, abscess of the brain, syphilis, nephritis, rheumatism, toxic agents (as lead or alcohol), infectious diseases, and anemia. Treatment consists in removing the cause.

11. *Foreign body in larynx* causes obstruction, dyspnea, violent coughing, stridulous respirations. Find the body by laryngoscopic examination, and remove it with laryngeal forceps or through a laryngotomy opening; failing that, by thyrotomy.

12. *Atrophic rhinitis.* The cause is disputed. It is said to follow purulent rhinitis in childhood, to be due to trouble

in the sinuses, and to be of neuropathic origin. The symptoms are dilatation of the nasal fossa, partial or complete atrophy of the middle and lower turbinated bones. On the lower and post-nasal space may be observed thick mucopurulent slugs of tenacious and ill-smelling pus. The treatment is often unsatisfactory. The surface is first cleansed of the thick tenacious mucus which is more conspicuous in the post-nasal space, with a warm alkaline fluid in a post-nasal douches. Probe and cotton may also be used. Stearate of zinc as a dusting powder, or ichthyol applications may be used. The latter is followed by an oil spray. Tonics are given.

OBSTETRICS.

1. Abortion is most dangerous in the *later* months of pregnancy.

Treatment of inevitable abortion: "If the preceding plan of treatment fails and abortion seems inevitable, the emptying of the uterus should be hastened.

Two methods of treatment have been advised for these cases. The first is *the expectant plan,* which may be described briefly as follows: Place the patient in bed, and if the bleeding is profuse, insert a tampon of iodoform gauze (1 yard) well up against the cervix. If this fails to control the hemorrhage, reinforce it by another yard or two of gauze and a perineal pad and binder. Small doses (3½) of the fluid extract of ergot should now be given every 2 or 3 hours. At the end of from 8 to 12 hours remove the tampon, when the ovum may be found extruded from the cervix; if not, a vaginal douche of mercuric chlorid; (1:4000) must be given, and another tampon introduced. If, upon the removal of this second tampon at the end of 10 or 12 hours, the ovum is not discharged, then more vigorous methods to secure its expulsion must be adopted.

The active plan comprises the following: The physician's hands and instruments are sterilized; the patient is etherized and placed on an appropriate table, or across the edge of the bed, her buttocks resting upon a Kelly pad; the genitalia are thoroughly cleansed and a vaginal douche of mercuric chloride (1:4000) is given; the anterior lip of the cervix is brought down to the vulvar orifice; the cervix is dilated if necessary; the placental forceps are introduced into the uterus, and as much as possible of the ovum is removed; the uterus is thoroughly cureted, and an intrauterine douche of sterile water is given. A light tampon of iodoform gauze is placed in the vagina; the patient is then returned to bed.

A strip of gauze may be placed in the uterus in cases of sharp retroflexion, to secure free drainage, and occasionally an intrauterine tampon will be necessary when the

uterus refuses to contract and hemorrhage persists after the use of the curette." (Gould and Pyle's *Pocket Cyclopedia.)*

2. PERNICIOUS VOMITING OF PREGNANCY. *Causes:* Toxemia, reflex irritation, and neurosis. *Treatment:* If possible, remove the cause; pay attention to hygiene, diet; almost any drug can be tried, iodine, cerium oxalate, bismuth, strychnine, ipecac, bromides, cocaine, have all been recommended; induction of labor or abortion may be necessary.

3. There are no particular symptoms during pregnancy that would lead one to fear postpartum hemorrhage.

4. *Preventive treatment:* (1) The amount of nitrogenous food should be diminished to a minimum; (2) the production and absorption of poisonous materials in the intestines and body tissues should be limited and their elimination should be aided by improving the action of the bowels, the kidneys, the liver, the skin, and the lungs; (3) the source of the fetal metabolic products and the peripheral irritation in the uterus should, if necessary, be removed by evacuating that organ. *Curative treatment:* (1) Control the convulsions (by chloroform, veratrum, or chloral); (2) eliminate the poisons which are presumed to cause the convulsions; (3) empty the uterus under deep anesthesia, by some method that is rapid and that will cause as little injury to the woman as possible.

5. *Diagnosis of breech:* "By abdominal palpation the head is found above, the breech below. The heart-sounds are heard above the level of the umbilicus. Digital examination shows a high position of the presenting part; an absence of the dome-like projection of the vaginal vault which is found in a presentation of the head; the bag of waters projects through the os as a pouch-like protrusion; by pressure on the fundus with the external hand the characteristic features of the breech may be detected by the finger in the vagina—namely, the nates and the sulcus between them, the tip of the sacral bone and the coccyx, the thighs, the external genitalia, and the anus. Evacuation of meconium is the rule in a breech presentation; so that the examining finger is found stained with it, after the membranes have ruptured."

Treatment: "Before labor external version may be attempted. It will not always be found practicable, and after the fetal body has been turned there is a disposition on the part of the fetus to resume its original position. The application of two long cylindrical compresses to the sides of the uterus, and a firm abdominal binder, may prevent a return of the breech presentation. When labor has begun, inaction should be the physician's policy until the fetal body is born to the umbilicus, unless maternal or fetal life

is threatened or an indication for rapid delivery arises. As soon as the trunk appears the patient should be placed in the lithotomy position across the bed, and delivery of the shoulders and head should be effected by pressing upon the fundus with one hand, the other hand being inserted in the vagina to favor anterior rotation of the shoulder, anterior rotation of the occiput, and to direct the passage of the head through the vagina. (Hirst's *Obstetrics.)*

The fetal mortality is due to: Prolapse or compression of the cord, interference with placental circulation, extension of head or arms; premature inspiration.

6. *Indications for the use of forceps are:* (1) *Forces at fault:* Inertia uteri in the presence of conditions likely to jeopardize the interests of mother or child. (*a*) Impending exhaustion; (*b*) arrest of head, from feeble pains. (2) *Passages at fault:* Moderate narrowing, 3¼ to 3¾ inches, true conjugate; moderate obstruction in the soft parts. (3) *Passenger at fault:* A. Dystocia due to (*a*) occipito-posterior: (*b*) mentoanterior face; (*c*) breech arrested in cavity. B. Evidence of fetal exhaustion (pulse above 160 or below 100 per minute). (4) *Accidental complications:* Hemorrhage; prolapse funis; eclampsia. All acute or chronic diseases or complications in which immediate delivery is required in the interest of mother or child, or both. *Contraindications:* Mechanical obstruction in the parturient canal; incomplete dilatation of the os; non-rupture of membranes; non-engagement of the presenting part; the fetal head being too large or too small; distended bladder or rectum.

7. Particular care must be taken in any operative procedure.

8. See above, question 4.

GYNECOLOGY.

1. *Cervical endometritis* is "usually secondary to some impairment of the general health or to displacements of the uterus, laceration of the cervix, and gonorrhea. The symptoms are headache, backache, pain in pelvis, and the presence of characteristic, whitish, opaque, thick, and tenacious discharge. A possible cause should be sought for and corrected. The general health will be improved by the administration of preparations containing iron, such as Blaud's pill, Basham's mixture, and the 4 chlorides. Exercise, diet, and the condition of the bowels should receive attention. The local treatment consists in the administration of hot vaginal douches 2 or 3 times daily; the use of glycerine tampons for 12 hours, twice a week; the application of tincture of iodine to the cervix, once a week; and the application of silver nitrate, zinc chloride, pure carbolic acid, or Churchill's tincture of iodine directly to the

cervical mucous membrane." (Gould and Pyle's *Pocket Cyclopedia.*)

2. The LIGAMENTS OF THE UTERUS are: (1) *Broad ligaments,* which extend outward on each side from the side of the uterus to the side of pelvis. (2) *Rectouterine ligaments,* which extend backward from the intraperitoneal potrion of the cervix uteri to the peritoneal investment of the rectum. (3) *Round ligaments,* which extend from the uterus just below the Fallopian tubes, through the inguinal canal to the labia majora. (4) The *ovarian ligaments,* which extend from the superior part of the uterus, behind the Fallopian tubes, to the inner end of the ovary. (5) The *uterosacral ligaments,* which extend from the highest part of the cervix uteri to the sides of the sacrum opposite the lower border of the sacroiliac synchondrosis.

3. "The pus in a pelvic abcess points and escapes in one of many situations. The abscess may open into the mucous canals of the pelvis—rectum, vagina, or even the bladder. It may point in the groin, immediately above or below Poupart's ligament; the pus will sometimes burrow beneath the fascia lata, and point in the middle of the thigh, usually on the outer side. Occasionally it travels by the side of the urachus and points at the navel; exceptionally it will burrow through the great sciatic notch and gain the buttock." (Sutton and Giles' *Diseases of Women.*)

4. *General outline of treatment for diseases and disturbances of the menopause:* "This must be directed to regulating the secretions. Generally constipation, previously troublesome, becomes aggravated, and portal congestion frequently occurs. Saline purgatives are especially beneficial, and these may be judiciously administered in the form of mineral waters, such as the Hunyadi Jànos or Friedrichshall. Blue pill with aloes is often very useful. The headaches and reflex nervous symptoms may be best combated by the administration of bromide of potassium, and this drug appears to act as a direct sedative to the sexual organs, besides diminishing the amount of blood determined to them. Occasionally bleeding from the arm or cupping gives great relief. Attention must, above all, be paid to the diet. It should be plain and unstimulating; beer and spirits should be prohibited, and only light wines, if any, allowed. Tepid baths are useful. Late hours, heated rooms, and excitement of all kinds should be avoided. If local troubles arise they must be treated according to their indications. It is clearly impossible to map out any empirical line of treatment for a condition in which the symptoms are so variable."—(Quain's *Dictionary of Medicine.*)

SURGERY.

1. Asepsis, antisepsis, and anesthesia. *Asepsis* means

keeping germs away from a part or a thing.

Antisepsis means killing germs or inhibiting their growth.

Anesthesia is loss of sensation, chiefly tactile sensation (and often, loss of consciousness).

2. Anesthetics are general, when the patient is made unconscious; and local, when the patient is not unconscious, and the anesthesia only affects a certain point.

The order of frequency is ether and chloroform for general anesthesia, and cocaine first for local anesthesia.

Chloroform is a colorless liquid of sweetish, peculiar odor and taste, with anesthetic properties. Chemically it is trichlormethane. *Ether* is a colorless liquid, of peculiar odor and taste, with anesthetic properties. Chemically it is ethyl oxide. As a general rule, ether would be the anesthetic of choice. But chloroform may be used: (1) In hot climates; (2) when large numbers of persons have to be rapidly anesthetized; (3) in brain surgery; (4) in labor; (5) in patients who are known to take ether badly; and (6) in the conditions mentioned below, in which ether is contraindicated. The following *contraindications* for ether and chloroform are from Hare's "Practical Therapeutics": "*Ether* should not be used by inhalation in bronchitis or acute nephritis because of its irritant properties; in peritonitis or gastritis, because it is apt to induce vomiting; in aneurysm or in the presence of marked vascular atheroma because it may rupture a blood-vessel by raising arterial pressure; nor in diabetes, lest it produce diabetic coma; and if anemia is present and an examination of the blood shows that the hemoglobin is below 50 per cent., the use of the drug should be avoided if possible. *Chloroform* is not to be used in cases of fatty heart or dilatation of the heart, in those with a known idiosyncrasy, nor in the so-called lymphatic persons with overgrowth of lymphoid tissues, as, for example, adenoids. In the latter case it is particularly apt to cause sudden death. In valvular disease of the heart chloroform may be used with caution, although ether is preferable. Given a case of valvular disease that must be subjected to operation, the chances are bettered with an anesthetic than without it, as the pain and mental shock are worse for the heart than is the anesthetic."

3. *Ruptured urethra.* Considerable pain, made worse by trying to urinate; shock; retention of urine; perineal swelling; internal hemorrhage; urine infiltrates, causing gangrene and sloughing. *Treatment:* Suprabupic cystotomy and perineal section are necessary; the urethra must be sutured. The posterior end is found by passing a catheter from the bladder. Silk is used, and the roof of the urethra is sutured first, then a steel sound is introduced from the meatus, and the urethra sutured around the sound.

4. *Tracheotomy* is incision into the trachea. It is indicated in: Foreign bodies or diphtheritic membrane in the trachea or larynx, edema of larynx, stenosis or compression of larynx by tumors, as a preliminary to certain operations on mouth, tongue, larynx.

5. Chill, shock, and rapid collapse, signs of internal hemorrhage and sepsis. Laparotomy is indicated.

6. "In *obstruction from gall-stones* there is pain and tenderness in the right hypochondrium, due partly to inflammation, and partly to muscular spasm. When impaction (even of inspissated mucus) occurs in the ducts, the pain is specially severe (biliary colic), causing colicky cramps, collapse, and vomiting; and this continues until the concretion is loosened or passed. If the *cystic duct* alone is blocked, there will be distension of the gall-bladder, giving rise to a rounded tumor, which can often be made out below the border of the liver; and occasionally a tongue-shaped lobe can be detected above it. If the *common duct* is blocked, there will be jaundice as well. If only the *hepatic duct* is blocked there will be jaundice and often fever and chills, but no distension of the gall-bladder. With *inflammation of the gall-bladder* there are aching pains, fever, and sometimes signs of localized peritonitis. There is occasionally jaundice; but if neither the common nor hepatic ducts are obstructed by stones or inflammatory thickening, it will not be manifest. In *empyema of the bladder,* it is distended to form a palpable tumor; unless shriveled so much by previous inflammation that it is retracted below the border of the liver." (Buchanan's *Surgery.)* Cholecystotomy is indicated.

7. In fractures below the insertion of the pronator teres the forearm is placed midway between pronation and supination, and the interosseous space preserved by means of pads. In fractures above this point the forearm should be put on an anterior angular splint, in full supination. If there is a persistent tendency to ulnar bowing of the forearm, i. e., convex toward the ulnar side, the elbow may be extended and a long straight splint or a plaster cast applied.

8. "No difficulty is experienced in reduction, but the displacement is very liable to recur, especially in the more common form. The elbow is then flexed to a right angle, and pads of lint or small towels placed over the acromion and beneath the elbow; a bandage or strap is then applied over the shoulder and under the elbow, and suffices to maintain the bone in position. The strap is kept from slipping by passing a bandage under it round the opposite side of the chest. Should the displacement persist and give rise to pain or impair the movements of the arm, the bones

may be wired together after removing the cartilaginous surfaces." (Rose and Carless.)

PHYSICAL DIAGNOSIS.

1. *Physical signs of lobar pneumonia.* "*Inspection* reveals during the first stage deficient movement of the affected side, due to pain. The apex beat is normal in situation and the interspaces do not bulge. In the second stage the healthy side rises normally, the affected side lagging behind. If both lower lobes are impervious to air the diaphragm cannot descend and the epigastrium does not project during inspiration, the breathing being conducted by the upper part of the chest (superior costal respiation.)

Palpation during the first stage shows the vocal fremitus to be more distinct than normal, especially over the diseased portions. In the second stage the vocal fremitus is markedly exaggerated, except in rare instances of occlusion of the bronchi by secretion. The cardiac impulse is felt in the normal position.

Percussion. In the first stage the percussion note is slightly impaired at times, having a hollow or tympanitic quality. In the second stage there is dullness over the affected parts, with an increased sense of resistance. Over unaffected adjoining areas the resonance is increased (Skoda's resonance.)

Auscultation. In the first stage there is heard over the affected part a feeble, vesicular murmur associated with the true vesicular or crepitant (crackling) râle heard at the end of the inspiration only. In the second stage there is harsh, high-pitched, bronchial respiration, at times resembling a to-and-fro metallic sound, except in those rare instances in which the bronchi are more or less filled with secretion. Bronchophony, or distinctly transmitted voice, is present and at times pectoriloquy, or distinct transmission of articulated sounds, may be heard. In the third stage the breathing changes from bronchial to bronchovesicular and the crepitant râle (crepitatio redus) returns. As resolution proceeds the breath sounds are associated with large and small moist and bubbling râles." (Hughes' *Practice of Medicine.)*

2. Edema, redness and bulging of the intercostal spaces, dyspnea, high fever, chills, leucocytosis, respirations increased, immobility of affected side, displacement of apex beat, dulness on percussion, breathing sounds are weak or inaudible.

3. Enlarged heart, feeble and irregular impulse, increased area of cardiac dulness, cardiac sounds are weaker than normal, the first sound is sharper than usual; valvular lesions (if present) give the characteristic murmur.

HYGIENE.

1. Each individual in the sick room should have 1,500 cubic feet of air space; this, allowing for the air to be changed three times in an hour, will allow 4,500 cubic feet of fresh air per hour.

2. Excrement exhaled from *lungs* per day is about 220 to 250 grams of carbon and about 330 grams of water; by the *skin*, about 2 grams of carbon, 650 grams of water, and various salts.

Assuming that the latter part of the question is correctly printed, proper ventilation and ample bathing should be provided for.

NEUROLOGY, MEDICAL JURISPRUDENCE, AND DIETETICS.

1. The median, ulnar, musculospiral, internal cutaneous, and musculocutaneous nerves.

2. THIRD CRANIAL NERVE. *Origin:* Inner side of the crus cerebri, in front of pons Varolii, and (deep origin) from the floor of the aqueduct of Sylvius. *Distribution and function:* See PHYSIOLOGY, 7. It leaves the skull through the sphenoidal fissure.

3. *Cerebrum* in skull, in anterior, middle, and posterior fossæ, covering the other parts. *Cerebellum*, under tentorium cerebelli and posterior part of cerebrum. *Pons* is between the medulla and crura cerebri. *Medulla* is the continuation upward of the spinal cord. The *spinal cord* is in the spinal column.

4. *Romberg's symptom* is inability of a person to walk with his eyes closed, or in the dark, or to stand thus upon one foot or with his feet together. It occurs in locomotor ataxia. There are three stages of this disease: (1) Pre-ataxic; (2) ataxic, or stage of incoordination; (3) stage of paralysis.

5. NERVE SUPPLY. Of *stomach:* Right and left pneumogastrics and solar plexus of the sympathetic; of *liver:* Left pneumogastric and solar plexus; of *spleen:* Splenic plexus (from solar plexus); of *diaphragm:* Phrenics, lower intercostals, and phrenic plexus (of sympathetic).

6. If respiration has taken place, the lungs will float on being put into water; if respiration has not taken place, the lungs will sink. Further, the lungs before respiration are situated at the back of the thorax and do not fill the cavity; whereas, after respiration, they fill the whole cavity.

7. Certainly, the physician is liable; the receiving of a fee does not enter into the question of malpractice.

8. The master cannot be held liable for the physician's fee unless he (the master) made a specific contract to pay the same.

9. Toast is more digestible

10. *Characteristics of a good drinking water:* (1) It

should be clear and limpid. Cloudy and muddy waters should be avoided. (2) It should be colorless. A greenish or yellowish color is usually due to vegetable or animal matter in solution or to organisms. (3) It should be odorless; especially free from sulphuretted hydrogen or putrefactive animal matter. (4) It should not be too cold, but should have a temperature of from 46° F. to 60° F. (5) It should have an agreeable taste; neither flat, salty, nor sweetish. A certain amount of hardness and dissolved gases give a sparkling taste. It should contain from 25 to 50 c.c. of gases per liter, of which 8 to 10 per cent. is carbon dioxide and the rest oxygen and nitrogen. (6) It should be as free as possible from dissolved organic matter, especially of animal origin. (7) It should not contain too great an amount of hardness. A certain quantity of saline matter is necessary, however, to give it a good taste. It should not contain over three or four parts of chlorine in 100,000 parts of water.—(From Bartley's *Chemistry.*)

11. Farinaceous foods should not be given to a child of less than nine months old; meat may be gradually introduced into the dietary in from three to six months later.

It is not clear what is meant by *nitrogenous food;* milk contains proteid (which is nitrogenous).

12. *In diabetes mellitus:* All sugars should be rejected. The same is true of starches. Bread is the most difficult of foods to deal with. The purer gluten flours may be used, but they are difficult to obtain. Aleuronat or almond flour may be substituted. Most meats and fish are permissible, and the greens and relishes may be taken freely. Farinaceous foods and potatoes or other vegetables rich in carbohydrates must be avoided. Eggs, butter, cheese, and milk are allowed. Saccharin may be used in place of sugar for sweetening.

The chief articles prohibited are liver, wheat bread, corn flour, rice, sago, arrow-root, barley, oatmeal, tapioca, macaroni, puddings, beet-root, sweet vegetables, potatoes, carrots, peas, beans, parsnips, turnips, all sweet fruits, apples. pears, plums, grapes, oranges apricots, peaches, gooseberries, dates, watermelon, sweet wines, cordials, porter, lager beer, cider, mustard, honey, sweets, ices, jams treacle. *(Pocket Cyclopedia.)*

STATE BOARD EXAMINATION QUESTIONS.

College of Physicians and Surgeons of Ontario.

Anatomy, descriptive.

(All questions of equal value. Any five questions to be answered, but not more than five.)

1. Describe (*a*) the upper extremity, (*b*) the lower extremity, (*c*) ossification of the ulna.
2. Describe the shoulder joint, as to (*a*) articulating surfaces, (*b*) ligaments, (*c*) synovial membranes, (*d*) nerve supply, (*e*) blood supply, (*f*) movements.
3. Name and give origin, insertion, nerve supply, and actions of the muscles of mastication.
4. Describe the lymphatic vessels, and lymphatic glands of the thorax.
5. Describe the prostate gland under the following heads: (*a*) size, (*b*) situation, (*c*) structure, (*d*) blood supply, (*e*) relations.
6. Describe the middle ear.
7. Trace the course; give the relations; name and trace the branches of the posterior tibial artery.
8. (*a*) Describe the sacral plexus and show its method of formation. (*b*) Trace the great sciatic nerve to its termination.
9. Describe (*a*) the fornix, (*b*) corpora quadrigemina, (*c*) opercula insulæ, (*d*) velum interpositum.
10. Describe the capsules, as to (*a*) size, (*b*) situation, (*c*) structure, (*d*) relations, (*e*) blood supply, (*f*) nerve supply.

PHYSIOLOGY AND HISTOLOGY.

1. Give an account of the histological structure of the retina. What portion of the retina is concerned in most acute vision? What is the "blind spot"?
2. Give an account of the histological structure and function of the suprarenal bodies.
3. Describe the development of the lungs. What is meant by the terms residual air and vital capacity?
4. What physical and chemical changes take place in a muscle during contraction?
5. What is the normal arterial blood pressure? Discuss the factors which maintain and alter this pressure.

CHEMISTRY.

(All questions of equal value. The first four questions to be answered, and any two of the remaining four.)
1. Explain fully what is meant, when we say nitrogen is a triad. What is the atomicity of the oxygen and the ozone molecule, and why?
2. One gram of phosphorus is to be converted into the pentachloride, how many litres of chlorine at 15 degrees C. and 780 mm. are required?
3. Compare the physical and chemical properties of sodium and silver, mentioning the group of metals to which each belongs, and why.
4. Define the term paraffin. Give the names of the

acids corresponding to the first, second, and third members of the paraffins, and compare their percentage of composition.

5. Define an amine, an amide, and an imide, and mention a member of each group.

6. Give the names and chemical formulæ for bluestone, red precipitate, white vitriol, aqua fortis, mirbane, guncotton, cresol, and urea.

7. To what series of organic acids do each of the following belong: namely, acetic, oxalic, lactic, and tartaric acid? Give the general formula for each series.

8. How would you proceed to estimate the total nitrogen in 10 c.c. of urine by either the Kjeldahl or the Gunning method? Describe the procedure in detail of the method you select, mentioning the apparatus and reagents necessary.

(Atomic Weights.— Chlorine = 35.5; phosporus = 31; sodium = 23; silver = 108; nitrogen = 14; hydrogen = 1; oxygen = 16; carbon = 12.)

MATERIA MEDICA AND PHARMACOLOGY.

(All questions of equal value. Answer any five of the six questions.)

1. Give preparations of, with quantities: (*a*) A normal salt solution. (*b*) A one to two thousand bichloride of mercury solution. (*c*) A 2½% solution of carbolic acid. (*d*) Lime water. (*e*) A nutrient enema.

2. Define with example, styptic, specific, collyrium, alkaloid, alterative.

3. Compare as hypnotics, morphine, chloral hydrate, and sulphonal. Explain antagonism of morphine and atropine.

4. Outline a prescription containing a mineral acid, a nux vomica preparation, and a pepsin preparation.

5. State ordinary or other names for phenol, acetanilidum, nitroglycerinum, hydrargyri subchloridum, pulvis ipecacuanhæ compositus. Give dosage and specific action (shortly) of each.

6. Select a nitrate, a salicylate, a ferrum, an arsenicum, and an iodidum preparation. Give dose and method in detail of prescribing each.

THEORY AND PRACTICE OF MEDICINE.

1. Give the etiology, pathology, and symptoms of tabes dorsalis.

2. Describe a Flint's murmur and the supposed cause of its production. From what other murmur must it be distinguished, and how?

3. Describe chronic uremia, with reference to its occurrence, clinical features and treatment.

4. Give the causes and general symptoms of obstructive jaundice.

5. Give the etiology, clinical history, and physical signs of empyema. Name the chief modes of natural cure.

PATHOLOGY.

1. Discuss the causes and formation of stricture of the urethra. Explain the pathological conditions which may result from it.

2. What are the features which differentiate innocent from malignant growths? Give the gross appearance and microscopic structure of adenoma, or of a glioma.

3. Give the morbid anatomy of bone lesions in hereditary syphilis, and differentiate these from rachitic and tuberculous lesions.

4. Discuss the forms of puerperal infection and the usual modes of entry to the system. Name the lesions which may be produced, and describe briefly the pathology of any one of these lesions.

BACTERIOLOGY.

1. Explain the difference between active and passive immunity. Illustrate by example how each may be acquired.

2. Describe *Bacillus anthracis* under the following heads: morphology, staining, cultural characters, and pathogenicity.

THERAPEUTICS.

1. Give the treatment of a case of acute rheumatic fever.

2. State the therapeutic uses of ergot. Discuss its use in (*a*) hemoptysis, (*b*) hematemesis.

3. Angina pectoris: Give treatment during paroxysm, and in the intervals.

4. Give the treatment of a case of tuberculous peritonitis.

MIDWIFERY, OPERATIVE.

1. The head is lying in the right oblique diameter of pelvis, with the occiput pointing posteriorly: (*a*) Give the position of all the landmarks on making a vaginal examination. (*b*) How may this case end? (*c*) Treat the case if Nature's efforts are not successful.

2. Diagnose a breech. How would you break up a frank breech?

3. I have diagnosed a case as transverse presentation with the back of the child pointing towards the mother's feet. I am going to perform version: (*a*) What foot will I grasp? Why? (*b*) How would you deliver this after-coming head?

4. Give the symptoms of placenta prævia, and premature separation of the normally implanted placenta. Make a differential diagnosis.

MIDWIFERY, OTHER THAN OPERATIVE, AND PUERPERAL DISEASES.

1. Name the diseases in the mother liable to injure the fetus *in utero*, and enumerate the supposed causes of labor at full time.
2. Give the causes of post partum hemorrhage and the systematic line of treatment to follow.
3. Give the necessary advice to a patient in a case where you suspect eclampsia might supervene.
4. Treat a case of acute infantile colic.
5. What significance would you attach to the discharge of amniotic fluid tinged with meconium: (*a*) Breech presentations; (*b*) vertex presentations.

SURGERY, OPERATIVE.

(All questions of equal value. Any five questions to be answered, but not more than five.)

1. Scirrhus of the mammary gland: Describe minutely the operation necessary for complete removal.
2. For what conditions would you do excision of the elbow? Describe the operation.
3. What symptoms in a movable kidney render operation advisable? Describe one method of operation for same.
4. What conditions require, and what is the usual method of performing (*a*) thoracentesis; (*b*) resection of ribs.
5. Describe the suprapubic and perineal operations for removal of enlarged prostate. Give reasons for your preference in choice of operation.
6. Describe one method of performing colostomy. Give reasons for your choice of operation. State conditions for which the operation may be required.

SURGERY, OTHER THAN OPERATIVE.

(All questions of equal value. Any five questions to be answered, but not more than five.)

1. Define septicemia and pyemia. Distinguish between them; give bacteriology, clinical history, symptoms, diagnosis, and treatment of each.
2. What is tetanus? Give predisposing and exciting causes, clinical history, diagnosis, and treatment.
3. Describe acute infective osteomyelitis. Discuss its clinical history and treatment.
4. What is aneurysm? Describe its structure. Describe popliteal aneurysm, and give its diagnosis and treatment.
5. What are the general principles governing the treatment of fractures at or near joints? Describe Colles' fracture, and give treatment.
6. Describe the clinical history of a case of enlarge-

ment of the prostate gland. Describe the general principles of treatment, apart from the operative.

MEDICAL AND SURGICAL ANATOMY.

1. Where would you map out the position of the following structures on the surface of the skull: (*a*) the middle meningeal artery, (*b*) the fissure of Rolando, (*c*) lateral sinus.
2. Where are the reflex centers for the bladder, rectum, ankle clonus, knee jerk, for wrist and elbow jerks?
3. What enters into the formation of the wrist joint?
4. Describe Colles' fracture, Pott's fracture, and deformity in each.
5. What anatomical relations may be determined under normal conditions by a digital examination of the rectum? (*a*) in the male, (*b*) in the female?
6. Give a description of the normal uterus with appendages, as to size and position.
7. Give in some form, the parts cut through in amputation of the leg, upper third, and name of main vessels tied, and where found.
8. What tumors may be found in the right and left inguinal region and in hypogastric regions?
9. Describe Scarpa's triangle, boundaries, and of what importance is it surgically?
10. Give the collateral circulation after ligature of the femoral artery in Hunter's canal.

MEDICAL JURISPRUDENCE.

1. On opening the thorax for a postmortem, what precaution is to be observed?
2. With regard to the external appearance of the heart, what important condition is to be observed?
3. After the removal of the heart, how would you make your incision to examine the interior?
4. Death by suffocation, how is it produced?
5. Give the average weight in an adult of brain, heart, spleen, liver, and kidney.

TOXICOLOGY AND MENTAL DISEASES.

6. Give (*a*) Symptoms of a cocaine poisoning. (*b*) Period when fatal. (*c*) Fatal quantity.
7. What are the special indications of mental weakness.
8. Distinguish between opium poisoning, acute alcoholism, epilepsy, and cerebral hemorrhage.

SANITARY SCIENCE.

1. (*a*) What becomes of the rain that falls during the year? (*b*) What are the objections to using rain water, as it falls, for domestic purposes?

2. (*a*) What are the different sources for water supply? (*b*) Describe three different methods of purifying water for domestic use. (*c*) Name objections to storing water in cisterns. (*d*) How should a cistern be constructed to permit of the safe use of water thus stored?

3. Name the diseases caused by the use of impure water.

4. What do you understand by the term inspection, flushing, and ventilation of sewers?

5. Describe purification and utilization of sewage.

6. Name (only) the methods by which air is vitiated.

7. What are the advantages of a mountain climate, as contrasted with those of the plains?

N. B.—Any of the above questions can be answered in thirty words.

THERAPEUTICS.

1. What are the indications for the use of belladonna (*a*) externally, (*b*) internally? Give the symptoms and treatment of an overdose.

2. Describe fully the treatment for ascites, giving reasons for each measure employed.

3. In a case of deranged heart action, state fully the indications for the employment, respectively, of (*a*) digitalis, (*b*) strophanthus, (*c*) strychnine, (*d*) nitroglycerin.

4. Write prescription for each of the following conditions: (*a*) pleurisy with effusion, (*b*) suppression of urine, (*c*) sciatica, (*d*) alkaline cystitis.

DISEASES OF WOMEN.

1. In making the incision to perform abdominal hysterectomy, you accidentally open the urinary bladder for two inches in extent. Describe in detail your method of repair. What suture material would you use? Would you repair immediately, or at the conclusion of the hysterectomy? What after treatment would be necessary?

2. Give the causes and treatment of pruritus vulvæ.

3. Describe the operation for, and the after-treatment of, repair of complete perineal rupture—say eight months after confinement.

4. A mass the size of a small orange is found in the posterior *cul-de-sac;* differentiate between retrodisplaced uterus, fibroid of the uterus, and ovarian cyst.

5. In using the uterine sound give the: (*a*) preliminary preparation, (*b*) indications, (*c*) contraindications, and (*d*) dangers.

DISEASES OF CHILDREN.

1. Define laryngismus stridulus (spasmodic croup), and give the predisposing and exciting causes, symptoms, the diseases for which it may be mistaken, and its treatment.

2. Discuss briefly the diagnostic values of Kernig's and

Babinski's reflexes. What change, if any, occurs in the patellar reflex (knee jerk) in lobar pneumonia?

3. Diagnose and treat a case of acute rheumatic endocarditis in a child ten years old.

4. Acute osteomyelitis: (*a*) Name in order the three most common infecting germs, (*b*) the three bones in which it most frequently occurs, (*c*) and the diseases for which it may be mistaken. What would be your treatment of an acute attack of the *very early* stage of the disease, as soon as you felt fairly sure of your diagnosis?

5. A child 4 years old receives a penetrating wound of the brain from the tine of a pitchfork. The point of entry is one inch above the meatus auditorius externus, and the fork goes straight in, horizontally, to a depth of three inches or half-way through the brain. Name in some order the structures that would be pierced. What symptoms would likely follow and the treatment from the beginning to the end of the case.

ANSWERS TO STATE BOARD EXAMINATION QUESTIONS.

College of Physicians and Surgeons of Ontario.

ANATOMY, DESCRIPTIVE.

1. The *upper extremity of the ulna* is large and irregular and presents the olecranon process, the apex of which is received into the olecranon fossa of the humerus; the triceps muscle is inserted in its upper border; the lateral ligaments are inserted at the sides. The coronoid process projects from the anterior surface and is received (during flexion) into the coronoid fossa of the humerus. The great sigmoid cavity is on the upper surface, and the lesser sigmoid cavity on the outer surface. The *lower extremity of the ulna* is small and cylindrical, and presents the head, which articulates below with the triangular fibro-cartilage; also it has the styloid process.

Ossification is by three centers, one for the shaft and one for the lower extremity and one for the olecranon.

2. The *shoulder-joint* is an enarthrodial joint formed above by the glenoid cavity of the scapula and below by the head of the humerus. Its ligaments are glenoid, coraco-humeral, and capsular. The glenoid surrounds the edge, deepens the glenoid cavity, and is continuous above with the long head of the biceps tendon. The capsular ligament, extensive and loose, arises above it from circumference of glenoid cavity behind the ligament, is attached below to the anatomical neck of humerus, and is pierced by tendons of two or three muscles. The coraco-humeral, or accessory, is a fibrous band which extends obliquely

downward and outward from the coracoid process to the anterior part of great tuberosity, strengthening the capsular ligament. A *synovial membrane* lines the joint, and forms the bursa under the subscapularis. It is reflected round the tendon of the biceps, and lines the bicipital groove. The *nerve supply* is from the circumflex and suprascapular nerves. The *arteries* are branches of the anterior and posterior circumflex, and the suprascapular. *Movements:* "The shoulder-joint is capable of movement in every direction, forward, backward, abduction, adduction, circumduction, and rotation. The humerus is drawn *forward* by the pectoralis major, anterior fibers of the deltoid, coracobrachialis, and by the biceps when the forearm is flexed; *backward,* by the latissimus dorsi, teres major, posterior fibers of the deltoid, and by the triceps when the forearm is extended; it is abducted (elevated) by the deltoid and supraspinatus; it is *adducted* (depressed) by the subscapularis, pectoralis major, latissimus dorsi, and teres major; it is *rotated outward* by the infraspinatus and teres minor; and it is *rotated inward* by the subscapularis, latissimus dorsi, teres major, and pectoralis major." (Gray.)

3. MUSCLES OF MASTICATION. MASSETER: SUPERFICIAL PORTION. *Origin,* inner surfece of zygoma and malar process of superior maxilla; *insertion,* into the ramus and angle of the lower jaw. DEEP PORTION.—*Origin,* posterior border and inner surface of the zygoma; *insertion,* into the ramus and coronoid process of the jaw; *action,* raises the lower jaw, and the superficial portion assists in drawing it forward; *nerve,* inferior maxillary.

TEMPORAL.—*Origin,* from the temporal fascia and the temporal fossa; *insertion,* into the coronoid process of the lower jaw; *action,* raises and draws backward the lower jaw; *nerve,* inferior maxillary.

INTERNAL PTERYGOID.—*Origin,* from pterygoid fossa and the tuberosity of the palate-bone; *insertion,* into the innner side of the ramus and angle of the lower jaw; *action,* draws forward and raises the lower jaw; the accessory triturating muscle of mastication; *nerve,* inferior maxillary.

EXTERNAL PTERYGOID.—*Origin,* by two heads—the lower from the tuberosities of the palate and superior maxilla and from the external pterygoid plate, the upper from the pterygoid ridge on the greater wing of the sphenoid; *insertion,* into the front of the neck of the lower jaw and inner side of interarticular cartilage; *action,* draws the jaw forward; triturating muscle of mastication; *nerve,* inferior maxillary.

4. *Lymphatics of the thorax.* The *intercostal* lymphatic vessels, derived from the side of the abdomen and thorax, pleuræ, diaphragm, spinal canal, muscles of the back, etc.,

follow the course of the veins, traverse fifteen to twenty intercostal glands near the heads of the ribs, and terminate in the thoracic duct. The *posterior mediastinal glands* are between the intercostal glands, and communicate with them. They receive vessels from the pericardium, esophagus, and diaphragm. Some of the efferent vessels end in the bronchial glands, others in the thoracic duct. The *anterior mediastinal lymphatic vessels* are derived from the anterior wall of the abdomen and thorax, the diaphragm, pericardium, upper surface of the liver, heart, and thymus gland. They traverse about eighteen to twenty *anterior mediastinal glands,* situated in the course of the internal mammary vein, pericardium, and great vessels of the heart, and terminate in thoracic and right lymphatic ducts. The pulmonary lymphatic vessels consist of a superficial and deep set, traversing in the last part of their course the pulmonary glands. The *bronchial glands* are twenty or more glands at the bifurcation of the trachea and root of the lungs, and receive the lymphatic vessels of the lungs and bronchi. They become pigmented, and are often the seat of disease. Their efferent vessels terminate on the right side in the right lymphatic duct, either directly or by forming the broncho-mediastinal trunk, and on the left side into the thoracic duct. (Young's *Anatomy.)*

5. *Prostate gland* is about 1½x¾x½ inches, and weighs about three-quarters of an ounce. It resembles a chestnut in size and form. It is situated at the neck of the bladder, and surrounds the first part of the urethra. It consists of fibromuscular (unstriated) tissue with imbedded follicular pouches, the whole enclosed in a firm fibrous capsule, continues in front with the triangular ligament, and behind with the posterior layer of the deep perineal fascia. *Arteries* are from the vesical, hemorrhoidal and internal pudic.

RELATIONS OF PROSTATE. *Anteriorly:* Symphysis pubis, anterior ligaments of bladder, branches of dorsal vein of penis. *Posteriorly:* Rectum. *Laterally:* Levator ani. *Base:* Surrounds neck of bladder, seminal vesicles, and vasa deferentia. The *apex* rests on triangular ligament.

6. The *middle ear* is an irregular cavity, situated between the auditory canal and the labyrinth, communicating with the pharynx through the Eustachian tube, and also with the mastoid cells. It contains a chain of movable bones, part of the chorda tympani nerve, and is filled with air. Its average diameters are about half an inch in height and width, and a line or two in depth from without inward. It is lined with mucous membrane, continuous with that of the Eustachcian tube and mastoid cells, and which is reflected over all the tympanic contents. It is

bounded by a roof, floor, and four walls. (Young's *Anatomy.)*

7. The *posterior tibial artery* is the continuation downward of the popliteal artery. It begins at the lower border of the popliteus muscle; it ends midway between the internal malleolus and the tuberosity of the os calcis, where it divides into the external and internal plantar arteries. Its *branches* are: Peroneal, nutrient, muscular, cutaneous, communicating, internal calcanean, and malleolar cutaneous. *Relationships. In front:* Tibialis posticus, flexor fascia, digitorum, tibia, and ankle joint. *Behind: Skin,* fascia, gastrocnemius, soleus, posterior tibial nerve, and abductor hallucis. *On inner side:* Posterior tibial nerve, at upper part. *On outer side:* Posterior tibial nerve, at loyer part.

8. *The sacral nerves,* five in number, divide into anterior and posterior nerves. The four upper sacral nerves, with the fifth lumbar, and a filament from the fourth, the two latter forming the lumbo-sacral cord, together form the *sacral plexus.* It lies upon the anterior surface of the pyriformis muscles, and is separated from the viscera, the sciatic and pudic branches of the internal iliac artery by the pelvic fascia. Its branches are: Muscular, superior gluteal, inferior gluteal, small sciatic, perforating cutaneous, pudic, and great sciatic.

The great sciatic nerve arises from the sacral plexus, and passes out of the pelvis through the great sacrosciatic foramen, below the pyriformis muscle; it extends down the back of the thigh, passing between the great trochanter of the femur and the tuberosity of the ischium; at the lower third of the thigh it divides into the internal and external popliteal nerves. It supplies the hip-joint and the biceps, semitendinosus, semimembranosus. and adductor magnus *muscles.*

9. The *fornix,* a lamella of white fibrous matter, beneath the corpus callosum, continuous with it posteriorly, but separated from it anteriorly by the septum lucidum. It consists of two symmetrical halves which join to form the *body,* each half having an anterior and posterior *crus* where they do not join.

Corpora quadrigemina are four spherical eminences placed in pairs above the valve of Vieussens, and behind the third ventricle, beneath the posterior border of the corpus callosum. The two anterior are called the *nates,* the two posterior the *testes.*

Opercula insulæ are convolutions surrounding the fissure of Sylvius. and which overlap and hide from view the island of Reil.

Velum interpositum. a vascular membrane, reflected from the pia mater into the interior of the brain through the

transverse fissure. It passes beneath the posterior border of the corpus callosum and fornix, and above the corpora quadrigemina, the pineal gland, and the optic thalami. It forms the roof of the third ventricle. Its anterior extremity passes on each side into the corresponding lateral ventricle, forming the anterior extremity of the choroid plexus. The vascular fringes of the velum interpositum projecting into the third ventricle are called the choroid plexuses of the third ventricle.

10. SUPRARENAL CAPSULES.—The suprarenal capsules are two small, triangular bodies situated upon the upper and front part of either kidney. They measure from one and one-quarter to two inches in length, and less in breadth, two to three lines in thickness, and weigh about two drachms. *Structure:* Like the kidneys, they consist of a cortical and medullary portion, inclosed in a capsule which sends septa into the substance of the body. The *cortex* is composed of three zones of epithelial cells—outer, middle, and inner—the middle being the largest. The *medulla* consists of streaks of small, transparent cells, separated by connective tissue and capillaries. These streaks are continuous with the inner zone of the cortex. The nerve supply is rich, consisting of non-medullated fibers connected with small ganglia. *Relations:* The inferior concave border rests upon the upper surface of the kidney. The inner border rests against the inferior vena cava on the right side, the aorta on the left, and is in relation with semi-lunar ganglion and great splanchnic nerves. The anterior surfaces touch on the right the under surface of the liver and on the left side the pancreas and spleen. The posterior surface lies upon the crus of the diaphragm, about opposite the ten dorsal vertebræ. *Arteries* are suprarenal from the aorta, the renal, and phrenic arteries. *Veins* on the right join vena cava; on left, renal vein. *Nerves,* from renal and solar plexus. (Young's *Anatomy.*)

PHYSIOLOGY AND HISTOLOGY.

1. The *retina* is composed of several layers, from without inwards, as follows: (1) layer of pigment cells; (2) layer of rods and cones; (3) the external limiting membrane; (4) the outer nuclear, or granular, layer; (5) the outer molecular, or reticular, layer; (6) the inner nuclear, or granular, layer; (7) the inner molecular, or reticular, layer; (8) the layer of ganglion cells; (9) the layer of nerve fibers; and (10) the internal limiting membrane.

These structures are bound together by sustentacular fibers or neuroglia.

The portion concerned in most acute vision is the macula lutea, and especially its central portion, the fovea.

The *blind spot* is that part of the retina at which the

optic nerve enters; it is occupied entirely by fibers of the optic nerve, and is devoid of any elements of the retina; it is insensitive to light.

2. For *histological structure*, see above, ANATOMY, 10. The *function of the suprarenal bodies* is not definitely settled; they produce an internal secretion which is probably necessary to life, which is also said to increase the blood pressure by a vasomotor action on the arterioles; some tonic action on the cardiac muscle is also attributed to them; and it is supposed that they are able to destroy or remove some toxic substances.

3. *Development of the lungs.* "The entodermic diverticulum, or pocket in which the gastric end of the primitive respiratory groove terminates, very early bifurcates into two vesicular portions, which represent the primitive right and left bronchi and lungs. From the first the right pulmonary vesicle is slightly the larger of the two. Both elongate, and almost immediately each part undergoes a subdivision—the right into three vesicles, and the left into two vesicles—thus early indicating the three lobes of the right lung and the two lobes of the left lung. The hypoblastic or entodermal subdivisions thus formed are surrounded by mesoderm. The main subdivisions continue to branch and rebranch, pushing their way into the pulmonary mesoblast, until the complete bronchial tree is formed. The method of subdivision is very characteristic, and from the first the various branches are bulbous or flask-shaped at their extremities. These bifurcate, and although at first the two subdivisions in each case appear of equal importance, one grows out as the continuation of the main bronchial stem, while the other remains as a lateral branch.

When the ramification of the entodermal tubes into the lung mesoderm is complete, the small terminal flask-shaped extremities of the various branches represent the infundibula. At first these are devoid of air-cells, but between the sixth month and the termination of gestation the alveolar diverticula make their appearance on the alveolar ducts and on the infundibula. It is thus seen that the epithelial lining of the entire system of bronchial tubes, infundibula and alveoli, is originally derived from the entodermal lning of the foregut. The other constituents which enter into the constitution of the lungs and bronchi are derived from the mesoblast. The rudiments of the lungs grow backward on either side of the esophagus into the fissure-like portion of the celom which occupies the thoracic region. They push before them the epithelial lining of the latter, and thus acquire their covering of visceral pleura. By the development of the diaphragm and the pericardium the pleural portions of the celom become cut

off from the peritoneal cavity and from each other." (Cunningham's *Anatomy.)*

Residual air is the air which still remains in the lungs after the deepest expirations. It measures about 100 cubic inches.

Vital capacity is the amount of air which can be expelled from the lungs by an extraordinary expiration after the most forcible inspiration. It includes the tidal, complemental, and reserve air, and measures about 225 to 230 cubic inches.

4. During contraction the following changes take place in a muscle:

(1) It becomes shorter and thicker, but the volume remains the same.
(2) It consumes oxygen.
(3) It sets free carbon dioxide.
(4) It forms sarcolactic acid.
(5) It becomes acid in reaction.
(6) It becomes more extensible and less elastic.
(7) There is an increase in heat production, and consequently a rise of temperature.
(8) The electrical reaction becomes relatively negative.

5. The normal arterial blood pressure varies; the systolic pressure being about 120 to 150 mm. of mercury, and the diastolic from about 90 to 120 mm. of mercury.

Blood pressure is *maintained* by the contraction of the heart, the peripheral resistance, and the elasticity of the arterial walls.

Blood pressure:

May be raised—	May be lowered—
1. By the heart beating more quickly.	1. By the heart beating more slowly.
2. By the heart beating more powerfully.	2. By the heart beating more feebly.
3. By contraction of the arterioles.	3 By dilatation of the arterioles.
	4. By deficient supply of blood to the left ventricle.

CHEMISTRY.

1. The combining power of one atom of nitrogen is equal to three times that of an atom of hydrogen; or one atom of nitrogen can combine with or replace three atoms of hydrogen (or other univalent element).

The atomicity of the oxygen molecule is two, because one molecule of oxygen (O_2) contains two atoms.

The atomicity of the ozone molecule is three, because one molecule of ozone (O_3) contains three atoms.

2. The equation is $P_4 + 10\,Cl_2 = 4\,P\,Cl_5$.

(4×31) grams P require (10×22.4) liters Cl.

124 grams P require 224 liters Cl, at normal tempera ture and pressure.

$\therefore$ 1 gram P requires $\frac{224}{124}$ liters Cl, at normal T and P, but at 15° C. and 780 mm. pressure:

1 gram P will require $\left(\frac{224}{124} \times \frac{273+15}{273} \times \frac{760}{780}\right)$ liters Cl.

$= \frac{224}{124} \times \frac{288}{273} \times \frac{760}{780} = \frac{68096}{36673} = 1.85$ liters of chlorine.

3. *Sodium* is a silver-white metal, is waxy at ordinary temperature, becomes quickly tarnished, and coated with a yellow film in air. It oxidizes in air; it burns with a yellow flame; it decomposes water with evolution of hydrogen. It is univalent, and has atomic weight of 23.

Silver is a white metal, soft, malleable, and ductile; is not acted on by pure air, but is blackened in air containing H_2S. It makes an alloy with many metals. It is an excellent conductor of heat and electricity. It is univalent, and has atomic weight of 107.

Sodium belongs to the group of alkali metals (Li., Na., K., Ce.); because the properties of these elements are similar.

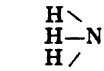
Silver resembles the members of the same group in *chemical* properties, and therefore might be placed with them; but its *physical* properties are more like those of copper, or gold, or mercury, and it has been classed by various writers with each of these metals.

4. *Paraffin* is a name given to the members of the methane series of organic compounds. They are saturated hydrocarbons, and have the general algebraic formula $C_n H_{2n+2}$.

ACIDS IN THIS SERIES.	FORMULA.	PERCENTAGE COMPOSITION.		
		C	H	O
1. Formic acid.	$H, COOH$.	26.08	4.34	69.56
2. Acetic acid.	$CH_3, COOH$.	40.00	6.66	53.33
3. Propionic acid.	$CH_2, CH_3, COOH$.	48.64	8.11	43.23

5. An *amine* is a substance derivable from ammonia by the substitution of a hydrocarbon radical for part or all of the hydrogen.

Example:—

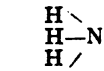


Ammonia.

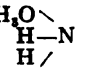
Methylamine.

An *amide* is a substance derivable from ammonia by the substitution of an oxidized radical for part or all of the hydrogen.

Example:—



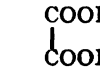
Ammonia.



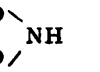
Acetamide.

An *imide* is a compound derived from a dicarboxylic acid by the substitution of NH for 2 OH.

Example:—



Oxalic acid.



Oximide.

6.

	NAME.	CHEMICAL FORMULA
Bluestone.	Cupric sulphate.	$CuSO_4$
Red precipitate.	Mercuric oxide.	HgO
White vitriol.	Zinc sulphate.	$ZnSO_4$
Aqua fortis.	Nitric acid.	HNO_3
Mirbane.	Nitrobenzene.	$C_6H_5NO_2$
Guncotton.	Hexanitrocellulose	$C_{12}H_{14}(ONO_2)_6O_4$
Cresol.	Methyl phenol.	$C_6H_4OH.CH_3$
Urea.	Carbamide.	CON_2H_4

7.

ACID.	SERIES, WITH GENERAL FORMULA OF SERIES.	
Acetic.	Paraffin monocarboxylic acids.	$C_nH_{2n}O_2$
Oxalic.	Paraffin dicarboxylic acids.	$C_nH_{2n-2}O_4$
Lactic.	Oxyacetic acids.	$C_nH_{2n}O_3$
Tartaric.	Dioxydicarboxylic acids.	$C_nH_{2n-2}O_6$

8. "For the *determination of total nitrogen* 5 c.c. of urine are placed in a long-necked Kjeldahl digesting flask along with 0.5 gm. of $CuSO_4$ and 15 c.c. of concentrated H_2SO_4. The flask is supported at 45° to the horizontal and gradu-

ally heated until white fumes are given off; 10 gm. of K_2SO_4 are then added, and the contents of the flask heated just short of boiling until almost colorless. After cooling, the contents of the digesting flask are transferred and washed into a distilling flask; the acid is nearly neutralized by the slow addition of NaHO solution (sp. gr. 1.24); a few pieces of granulated zinc are added, and then a moderate excess of NaHO solution, whereupon the flask is immediately connected with a bulb tube and condenser, so arranged as to deliver the distillate into a recipient containing 30 c.c. of N/5 H_2SO_4 and a little lacmoid as an indicator. The distillation is continued until about two-thirds of the liquid have passed over, when the excess of H_2SO_4 remaining in the recipient is determined by titration with N/5 NaHO solution. Each c.c. of N/5 acid neutralized by the ammonia formed in the process corresponds to 0.0028 gm. of nitrogen in the 5 c.c. of urine used. A blank process must be conducted with reagents alone to guard against error from nitrogen compounds in the reagents or in the air." (Witthaus's *Manual of Chemistry.*)

To estimate the amount of nitrogen in 10 c.c. of urine, multiply this result by two.

MATERIA MEDICA AND PHARMACOLOGY.

1. (*a*) A *normal salt solution* can be made by adding 1½ drams of sodium chloride to one quart of sterile water.

(*b*) A *one to two thousand bichloride of mercury solution* can be made by adding 7½ grains of mercury bichloride to a liter of water.

(*c*) A *2½ per cent. solution of carbolic acid* can be made by adding 6 drams of carbolic acid to a liter of water.

(*d*) *Lime water* is a saturated solution of lime. It is made by washing slaked lime and shaking it up in distilled water, using about one grain of lime to each ounce of water. After it settles the water is poured off from the sediment and strained.

(*e*) A *nutrient enema* can be made with 8 ounces of milk, three eggs, and half a dram of salt.

2. *Styptic* is an agent which, on being applied locally, stops bleeding. *Example*:—Silver nitrate.

Specific is an agent which has a distinctly curative effect on a particular disease. *Example*:—Quinine, in malaria.

Collyrium is an eye wash. *Example*:—Boric acid in distilled water (gr. j, or ij to ℥j).

Alkaloid is a basic nitrogenous substance of alkaline reaction, and capable of combining with acids to form salts in the same way that ammonia does. *Example*:—Morphine.

Alterative is an agent which modifies the course of a disease for the better; its action is not determined, but

probably it promotes waste and favorably modifies nutrition. *Example*:—Arsenic.

3. *Morphine* is the best where pain is present; it acts quickly, but it is most apt to cause a habit formation, and therefore should not be used unless necessary.

Chloral hydrate produces a natural sleep, acts promptly, but is of no service if pain is present; it also lowers the body temperature. It can be given for a long time without deleterious effect, but it may irritate the tissues and weaken the heart.

Sulphonal produces a natural sleep, but is of slow action, requiring 3 or 4 hours to take effect; it is of no use if pain is present, does not irritate the tissues and weaken the heart, but is probably not so good for continuous use as chloral hydrate, though the two may replace each other for a time.

"The *antagonism* between *morphine* and *atropine* is in part real, such as their respective effects on the convolutions, respiratory center and intestines. In part it is apparent only. Thus, the contraction of the pupil caused by morphine occurs through the pupillary center; the dilatation caused by atropine is referable to paralysis of the ciliary branches of the third nerve. Morphine is diaphoretic through the centers; atropine is anhydrotic through the terminal nerves of the glands. Both depress the heart and reduce blood pressure in poisonous doses. Thus morphine and atropine are not true antagonists, but the one may prevent or relieve certain effects of the other, and may therefore be (1) combined with the other for particular medicinal purposes, or (2) given in the treatment of poisoning by the other under particular circumstances." (J. Mitchell Bruce, *Materia Medica and Therapeutics.*)

4. Glycerini pepsini ℥j.
Tincture nucis vomicæ.
Acidi hydrochlorici diluti āā ♏xl.
Aquæ destillatæ q.s. ad ℥iv. Misce.
Signa:—One tablespoonful three times a day.

5.

	ORDINARY, OR OTHER NAME.	DOSE.
Phenol.	Carbolic acid.	1 to 3 grains.
Acetanilidum.	Antifebrin.	1 to 3 grains.
Nitroglycerinum.	Glonoin.	1 drop of a 1% solution.
Hydrargyri subchloridum.	Calomel.	½ to 5 grains.
Pulvis ipecacuanhæ compositus.	Dover's powder.	5 to 15 grains.

Phenol is an antiseptic and disinfectant. *Acetanilidum* is an antipyretic. *Nitroglycerinum* dilates the blood vessels, and lowers arterial tension. *Calomel* is a purgative. *Dover's Powder* is a diaphoretic, and lessens reflex irritation.

6. *Silver nitrate* is given internally in pill form, in doses of gr. 1/5.

Sodium salicylate, dose gr. iv, in syrup.

Tincture of chloride of iron, dose ♏vij in glycerin.

Fowler's Solution, dose ♏iij, in water, after meals.

Potassium iodide, dose gr. vij, in Compound Syrup of Sarsaparilla.

THEORY AND PRACTICE OF MEDICINE.

1. *Tabes dorsalis.* A disease of the nervous system characterized by sclerosis of the posterior columns of the spinal cord. The affection is most frequently seen in men past middle life and may be due to syphilis, exposure to cold and wet, traumatism, excesses, and infectious and toxic processes. *The symptoms* are motor incoordination, staggering gait, inability to walk in the dark or with the eyes closed, paroxysms of shooting pains in the thighs, various crises neuralgic in character, a feeling of constriction about the waist, alterations of sensations, absence of knee-jerks, Argyll-Robertson pupil, various optic and trophic phenomena, etc. The condition is incurable and may last for several years. *The treatment* consists in the administration of mercury, iodids, iron, zinc, arsenic, gold, strychnin, and other tonics and alteratives, as well as faradism; massage, gymnastics, and baths. *(Pocket Cyclopedia.)*

2. *Flint's murmur* is a presystolic murmur heard at the apex of the heart in some cases of aortic regurgitation. It is *supposed* to be due to the vibration of the anterior cusp of the mitral valve, as it lies between the regurgitating blood stream and that which is flowing into the left ventricle from the left auricle.

It is to be distinguished from mitral stenosis. This is best done by a study of the pulse, which is very different in these two conditions.

3. *Chronic uremia.* Persistent *headache, vertigo, and drowsiness*, either continuous or intermittent, passing into a condition of apathy or stupor, and ultimately into the *typhoid state*. There may be repeated attacks of *dyspnea*, with rapid shallow breathing and cyanosis, or *Cheyne-Stokes breathing* may occur. *Pruritus* is not uncommon. *Vomiting*, at first in the morning or after meals, later independent of food. The vomitus may contain urea. *Diarrhœa* is frequent. It may be simply catarrhal, or due to ulcerative colitis. *Hiccough* may be troublesome. The first attack of uremia may prove fatal, but in acute neph-

ritis complete recovery is frequent. In chronic nephritis the patient may survive the attack for several years. (Wheeler and Jack.)

Treatment consists of elimination of the poison, and treatment of the symptoms.

4. *Obstructive jaundice* may be caused by gall-stones and foreign bodies, inflammation of bile ducts, stricture of bile ducts, by pressure from without (tumors, adhesions, and pregnancy). *Symptoms* are: Yellow tint of skin and conjunctivæ, nausea, anorexia, constipation or diarrhea; feces pale, pasty and fetid; slow pulse, depressed spirits, pruritus.

5. EMPYEMA. *Causes:* Injuries, wounds, suppuration extending from neighboring foci, pleuropneumonia, tubercle or other bacilli. The intercostal spaces bulge and point, impaired movement of side of chest, dulness, diminished breath sounds and fremitus, displacement of heart, dyspnea, chills, fever, leucocytosis, rapid pulse. The lung becomes collapsed, and the visceral pleura then ties it down by becoming thick and contracted. The parietal pleura becomes enormously thick and fibrous. Permanent displacement of the heart and mediastinum, which become dragged over to the diseased side. The opposite lung undergoes some compensatory hypertrophy. The diaphragm and abdominal viscera are displaced upward. The chest wall falls in somewhat and the spine is curved with the concavity toward the disease.

The *chief modes of natural cure* are: Absorption of the fluid; perforation of the lung or bronchus; perforation of the chest wall.

PATHOLOGY.

1. STRICTURE OF URETHRA. *Causes:* (1) Spasmodic, induced by operation on genitals or anus. (2) Congestive, due to inflammatory swelling of the urethral mucous membrane, associated with some amount of spasm, and is usually due to gonorrhea. Organic, due to the contraction of cicatricial tissue in the walls of the urethra.

Causes: 1. Long-continued inflammation from gonorrhea is the commonest cause. 2. Traumatic stricture results from contraction of the cicatrix after rupture of urethra. 3. Stricture follows the healing of a urethral chancre. The commonest situation is in the bulb, but the orifice and membranous or penile portion may be narrowed.

Results: 1. The urethra is dilated behind the stricture and may be ulcerated. Forcible attempts at micturition may lead to rupture of extravasation, or inflammation may extend without rupture and cause a peri-urethral abscess. 2. The bladder hypertrophies, owing to its increased work, and becomes fasciculated. As the pressure increases the

mucous membrane becomes pouched out between the fasciculi (sacculation), and when cystitis comes on phosphatic concretions may form in the saccules. Perforation owing to ulceration, followed by extravasation, is rare. In the later stages hypertrophy gives way to dilatation and atony. 3. Hydronephrosis, pyonephrosis and pyelonephritis develop partly as the result of back pressure, and partly from the extension of sepsis to the ureter and kidney. *(Aids in Surgery.)*

2. ***Benign tumors*** are encapsulated, do not tend to infiltrate the surrounding tissues, do not give rise to metastatic growths, do not tend to recur after removal, do not produce cachexia, and do not have a fatal tendency (except from their location).

Malignant tumors are not encapsulated, tend to infiltrate the surrounding tissues, give rise to metastatic growths, have a tendency to recur after removal, give a cachexia, have a fatal tendency.

Glioma is usually single, but may be multiple, is soft, gelatinous, grayish or pink, according to the number of blood-vessels in it, the outline is not distinct. Microscopically, it contains glia cells, with a small amount of protoplasm, but large, round or oval nuclei, and many thin fibrils which interlace with each other.

3. In *hereditary syphilis* the bone changes are characteristic. The alterations occur at the junction of the epiphyses with the diaphysis of the long bones. Longitudinal section through these parts shows the line of junction as a bluish-white or yellowish-white irregular zone about 2 or 3 mm. in thickness. In more advanced stages this line becomes thicker and more yellow. The minute changes consist in proliferation of the cartilage-cells and subsequent fatty degeneration. Microscopically the proliferated cellular elements, fatty cells, and granular detritus are conspicuous features. The epiphyses may be completely separated from the shaft.

In *rhachitic lesions* are the beaded ribs, the curved long bones, the square-shaped skull, the pigeon breast, and the enlarged lower ends of the bones of the forearm.

In *tuberculous lesions*, tubercle bacilli can be detected, sequestra form, dactylitis is common.

4. The majority of puerperal infections are traceable to the insertion of pathogenic germs by the examining finger or hand of the physician, who in the course of his daily work may have touched the dried sputum of diphtheria, the desquamated skin of scarlet fever, suppurating wounds, erysipelatous surfaces, and other virulent infectious material. Even if the examining hand is protected by a sterile glove, pathogenic bacteria may be carried into the vagina from the vulva, if there is a faulty technique in making

the examination. The hands of the nurse or other attendants may be the agents that deposit bacteria in the vagina or upon the vulvar orifice. The implements used in and about the parturient canal, an atmosphere laden with dust or vitiated by foul unhygienic conditions, and the water used to wash and douche the patient may carry disease germs to the parturient woman and may introduce them into the genital canal. The bed clothing, the personal clothing, the mattress, the vulvar pads, the material used to cleanse the vulva (rags, sponges, cotton, cloths), may each and all be sources of infection. Putrescible material retained within the genital canal (especially within the uterine cavity) attracts the innumerable and ubiquitous soprophytes and their spores, with which the purest atmosphere swarms. The development of these bodies in a situation most favorable to their growth and active propagation may easily result in a toxemia, if not in actual invasion of the body by pathogenic germs. Coitus in the last weeks of pregnancy is said to be a source of infection of the genitalia in exceptional cases, by carrying pathogenic bacteria into the vagina. Finally, a certain proportion of cases may be traced to autoinfection—that is, to pathogenic germs resident in the body, and not introduced from without during or after labor." (Hirst's *Obstetrics.*)

BACTERIOLOGY.

1. "*Active immunity* follows an attack of a certain disease and secures immunity for that alone, which may last but a short time (erysipelas, cholera) or for a longer period (typhoid), or even for life (variola); or it follows inoculation of a virus weaker than necessary to cause the typical disease (vaccination against smallpox); or it follows inoculation by bacterial products apart from the organisms themselves.

"*Passive immunity* is the term applied to the effect of a serum derived from an immunized animal and injected into one not immune, the theory being that in the blood of the former there is a chemical substance (antitoxin) which neutralizes the toxin in the donating animal, or otherwise it would show symptoms, and by borrowing its serum for the infected animal the toxin is opposed by the alien antitoxin."—(From Thayer's *Pathology.*)

2. BACILLUS ANTHRACIS. *Morphology:* It is a large, rod-shaped microorganism, with slightly thickened ends; it is from 5 to 20 mikrons in length, and a little more than one mikron in breadth; it has a tendency to form long threads; it is nonmotile and nonflagellated; it is aërobic.

Staining:—It stains by all the alkaline aniline dyes, and also by Gram's method.

Cultural characters:—It grows on practically all media,

as a film on potato, in tree form in gelatin stab, it liquefies gelatin and also serum.

Pathogenicity:—It causes anthrax, splenic fever, malignant pustule, and woolsorter's disease. Infection takes place through wounds, or by the respiratory or alimentary tract. The bacilli are probably destroyed by the gastric juices, but not so the spores.

THERAPEUTICS.

1. Rest in bed, between blankets, patient wearing a flannel night-gown; diet should be of milk, and broths, no meat; lemondae or water may be used to quench thirst. Opium or antipyrin for pain; salicylates are beneficial. The joints may be painted with iodine and wrapped in cotton wool.

2. *Therapeutic uses of ergot:* Ergot stimulates and causes contraction of involuntary muscle fibers, hence it is a vasoconstrictor, hemostatic, and oxytocic. It is also a cardiac sedative, it raises the blood pressure, it increases peristalsis, and is an emmenagogue.

Indications: To promote uterine contractions during third stage of labor; fibroids, menorrhagia, post-partum hemorrhage. Some forms of amenorrhea and dysmenorrhea, dysentery, arterial hemorrhage, congestive headaches, laxity of sphincters, of bladder or rectum, hemorrhoids, aneurysm, diabetes, urinary incontinence, direct paralysis of the sphincter vesicæ, atonic spermatorrhea.

"While the efficacy of ergot in certain forms of metorrhagia has been conclusively proved, there is no satisfactory evidence that the drug is of value in other forms of hemorrhage, such as hemoptysis, hematuria, or hematemesis. On the contrary, our knowledge of its physiologic action indicates that it may be productive of harm. Granting that ergot can lessen the caliber of eroded, degenerated, or seriously wounded vessels, there is no reason for supposing that its influence is restricted to the vessels concerned in the bleeding, and if such is not the case, the universal constriction of the arterioles induced by the drug, and the consequent rise in the general blood pressure must favor the escape of blood from the injured vessels and militate against the formation of an occluding thrombus."—(Steven's *Materia Medica.*)

3. During the paroxysm, inhalation of 3 to 5 minims amyl nitrite is indicated; this may be followed by a hypodermic of morphine. In the interval, nitroglycerin (two minims of a one per cent solution), increasing one minim a day till the patient has flushings or headache.

4. "In the early stages of chronic tuberculous peritonitis the diet should be highly nutritive, and especially rich in fats. The bedroom should be freely ventilated, and when-

ever possible the patient should be much in the open air. Mercurial inunction is sometimes useful. Cod-liver oil, malt, etc., and iodoform given internally are often beneficial. Massage, with the administration of the iodides and tonics, may be of use. Laparotomy is often successful in tuberclous peritonitis. The precise reason for this is not known. It must not be forgotten that chronic peritonitis is often fatal through an acute exacerbation of inflammation." (Wheeler and Jack.)

MIDWIFERY, OPERATIVE.

1. (a) The occiput is depressed and posterior, and points to the right sacroiliac synchondrosis; the smaller fontanelle is in the same locality. The sagittal suture runs obliquely forward and to the left, in the line of the right oblique pelvic diameter. The shoulders lie at right angles to this, in the left oblique pelvic diameter. The anterior fontanelle may be felt anteriorly, high up and to the left.

(*b*) The case may end: (1) By anterior rotation of the occiput, (2) the occiput may remain posteriorly in the hollow of the sacrum; (3) a face presentation may result; (4) the labor may become arrested, or uterine inertia may ensue.

(*c*) (1) Manual rotation and extraction by forceps may be tried; or (2) forceps, rotation, and extraction; or (3) forceps extraction, with the occiput remaining posterior.

2. *Diagnosis of breech:* Abdominal palpation reveals the head above and the breech below. The heart-sounds are heard above the umbilicus. Vaginal examination shows high position of the presenting part, and when the os is dilated the characterstic features of the breech may be detected. Meconium is evacuated.

To break up a frank breech: Bring down a foot.

3. "In transverse presentations one foot is seized and version accomplished. The choice of the foot, however, is a matter of very considerable importance. When the back is directed anteriorly the lower one should be seized, as by so doing the back of the child is kept directed toward the symphysis; whereas, if the upper foot be seized the back may turn in the opposite direction. On the other hand, when the back looks posteriorly, the upper is the foot of choice since traction upon it will cause the back to rotate to the front; while, if the lower foot be seized, although anterior rotation wil usually occur, the upper buttock is liable to impinge upon the anterior portion of the pelvic brim, and great force may become necessary to effect its dislodgment." (Williams' *Obstetrics.)*

4. The differential points between placenta prævia and premature separation of a normally attached placenta are shown in the following table (from Dorland's *Obstetrics*):

PLACENTA PRÆVIA.	PREMATURE DETACHMENT.
Most commonly manifests itself after the sixth month of gestation, but may occur as early as the second month.	Most commonly occurs during the first stage of labor, but may occur at any time during the last three months of pregnancy.
The hemorrhage is abrupt, but painless.	The hemorrhage is sudden, and generally is attended with sharp pain.
There are generally repeated hemorrhages of increasing severity.	Hemorrhage persists until the uterine contents are evacuated or the patient perishes.
There is an edematous condition of the cervix and lower uterine segment, with marked pulsation.	Vaginal examination reveals no deviation from the condition normal to pregnancy.
Cervix is generally quite patulous, and within may be detected the placenta.	The cervix is perhaps (if labor be initiated) slightly patulous.
The placental bruit is situated low down.	The placental bruit is in normal position.

MIDWIFERY OTHER THAN OPERATIVE, AND PUERPERAL DISEASES.

1. The diseases of the mother liable to injure the fetus *in utero* are: Malaria, relapsing fever, typhoid, typhus, yellow fever, scarlet fever, measles, smallpox, cholera, pneumonia, cardiac disease with inadequate compensation, exophthalmic goiter, hepatic disease and jaundice, toxemia, eclampsia, diabetes, and pernicious anemia.

The *causes of labor at full term* are not definitely known. Among the theories held, or factors supposed to be involved, are the following: (1) The gradual distention of the uterus at the end of pregnancy, after it has reached the physiological limit of its growth, while the contents still continue to grow; (2) the fetus becomes a "foreign body," and as such excites uterine contractions and is extruded; (3) fatty degeneration of the placenta and of the decidua; (4) the circulation of toxic products in the placental blood acts upon a center in the medulla and so produces labor.

2. *Causes of postpartum hemorrhage:* Imperfect separation of the placenta, mismanagement of third stage of labor, retention of clots and pieces of membrane, endometritis, lacerations, atony of uterus, tumors, over-distention of uterus.

Treatment of post-partum hemorrhage: Grasp the uterus at once, through the abdominal wall, and massage it firmly. Anything in the uterus should at once be cleaned out. Pass

one hand into the uterus, and with the other on the outside make firm pressure. A hypodermic of ergotin, or ergot can be given by an assistant. An intrauterine douche of hot sterilized water (about 115° F.) may be given. Sometimes a very thorough packing and plugging of gauze of uterus and vagina may be necessary. Whatever is done must be done promptly; and everything likely to be needed for this emergency should be prepared beforehand in every labor. 3. Patient is to send frequent samples of urine to be examined; she is to report at once if there is a diminution in amount of urine, or if she has headaches, dizziness, specks before the eyes, constipation, drowsiness. Proper diet and hygiene are to be observed; meat must be kept to a minimum; plenty of water should be drunk; diuretics may be given.

4. *Treatment of infantile colic:* "The following formulas will in most cases give relief:

℞. Lime-water,
Comp. tincture of cardamom, each, ℥i.
Give a teaspoonful every half hour.

℞. Spirits of chloroform.....gtt. 16
Aromatic spirits of ammonia.....℥½
Sodium bicarbonate .....gr. 16
Syrup .....℥½
Peppermint water .....q.s. ℥2
One teaspoonful, as necessary, for pain.

"In many cases the most efficient method of relieving the pain is an enema of ℥¾ of warm water and sodium bicarbonate ℥½. A few drops of gin in warm water may be given by the mouth. Hot applications should be made to the abdomen, and if symptoms of collapse appear, a hot bath should be given."—(Gould and Pyle's *Pocket Cyclopedia.*)

5. (*a*) In a ***breech*** presentaation the discharge of meconium has no significance. (*b*) In a ***vertex*** presentation it is a danger signal, and implies a compressed cord, or fetal apoplexy, and delivery should be hastened.

SURGERY, OPERATIVE.

1. *Halsted's operation* aims to remove in one piece the entire breast and overlying skin, the costal portion of the pectoralis major, the pectoralis minor, and all the fat and glands of the axilla. The supraclavicular glands are removed in a second piece. An incision is carried through the skin and fat, and a triangular flap turned back. The costal portion of the pectoralis major is divided close to the ribs and separated from the clavicular portion, which with the overlying skin is divided up to the clavicle, exposing the apex of the axilla; these flaps are drawn upward with a retractor and separated from the underlying tissues,

and the muscle further split as far as the humerus, where it is severed close to the bone. The breast, pectoralis major, and all fat are stripped from the chest wall, including the pectoralis minor, which is divided at each end, thus exposing the entire axilla, which is cleansed of fat and lymphatic glands from above and within, downward and outward, all small vessels being ligated close to the axillary vessels, which, with the nerves, should alone remain. The triangular flap of skin is drawn outward and the lateral and posterior walls of the axilla likewise cleared, the subscapular vessels being ligated, and the subscapular nerves preserved if possible. The mass is then turned inward and removed from the chest. A vertical incision is now made along the posterior margin of the sternomastoid, and the supra- and infraclavicular fat and glands removed by dissecting from the junction of the internal jugular and subclavian veins downward and outward. The cervical wound is sutured, and the edges of the chest wound approximated by a buried purse-string suture of silk, which includes the base of the triangular flap, the apex being spread over the axilla. The rest of the wound is covered with Thiersch's skin grafts. The axilla is not drained. The disability resulting after such an extensive operation is surprisingly slight. The entire wound may be closed in most cases by fashioning two flaps from the lower lip of the wound. A small gauze drain should always be placed in the axilla, preferably through a small incision at its posterior margin, in order to drain the large quantity of fluid which escapes from the severed lymph vessels." (Stewart's *Surgery.)*

2. ***Excision of the elbow*** is performed for: Chronic joint disease (generally tuberculosis); wounds; faulty ankylosis, or other deformity; disease of the articular ends of the bones; fracture dislocation; compound comminuted fracture.

"In excising the elbow joint, the forearm is slightly flexed and a longitudinal incision is begun about two inches above the olecranon process and a ltle to its inner side, and carried about three or four inches down in the line of the ulna; the tissues are then divided down to the bones, and the ulnar nerve is dissected from its groove behind the inner condyle of the humerus and held aside by a retractor; the tendon of the triceps is divided, and its attachment to the fascia and periosteum over the olecranon process is separated with an elevator or periosteome and turned downward; the joint is next opened and the lateral ligaments divided as the forearm is flexed upon the arm. The upper part of the ulna and the head of the radius are freed with a probe-pointed knife and removed with a narrow-bladed saw, care being taken in making the section of the radius to divide its neck so that the attachment of the biceps

muscle is not interfered with. The condyles of the humerus are next freed and removed with a saw. In freeing the bones at the anterior portion of the joint, great care should be used to avoid injury of the brachial artery and vein and the median nerve." (Wharton's *Minor Surgery.)*

3. Operation is indicated, when the kidney is so tender that pressure cannot be tolerated, if hydronephrosis or pyelitis are present, or if the kidney is very movable and handling causes vomiting. *Operation:* "The kidney is usually exposed through an oblique lumbar incision, separated from the fat and drawn out of the wound. It can then be inspected so as to insure the absence of calculi, and that there is not a valvular obstruction at the commencement of the ureter. Then a crucial incision is made through the capsule and the four segments reflected toward the hilum. The upper two segments are fixed by sutures to the fibrous tissue and muscle covering the last rib; the two lower segments to the lumbar aponeurosis below the kidney in such a way as to form a sort of shelf for the kidney to rest upon. The raw surface of the cortex thus exposed can then form firm adhesions with the lumbar muscles. The wound can either be drained or plugged with gauze to favor a firmer scar. If there is any doubt the pelvis may be incised and washed free of urates, or possibly small calculi may be found and removed. Although healing is thus delayed a little, yet the adhesions will be all the firmer for the nephrotomy." (Walsham's *Surgery.)*

4. *Thoracentesis* is required for diagnosis, and relief of pressure, pneumothorax, pleurisy with effusion. *Resection of the ribs* is done in empyema.

Thoracentesis. The skin, the instruments, and the surgeon's hands must be asepticized. Give the patient a little whiskey, and, unless he is very weak, make him sit up in bed. The arm hangs by the side; and the surgeon introduces the needle in the fifth interspace, just in front of the angle of the scapula. The surgeon marks the upper border of the sixth rib with the index finger, and plunges in the needle just above the finger, thus avoiding the intercostal artery, which lies along the lower border of the rib above. Always guard the needle with a finger to prevent its going in too far. After withdrawing the needle, place iodoform collodion over the opening into the chest. In pleuritic effusion, if the lungs will not expand after tappings, perform thoracotomy.

Resection of the ribs "consists in removing a portion or several of the ribs, for the purpose of allowing the chest-walls to fall in, in cases of empyema where, after the pleura has been drained, the lung in consequence of adhesions does not expand. An incision three or four inches in length may be made obliquely downward and inward

over the side of the chest; just in front of the latissimus dorsi, across the ribs the portions of which it is intended to excise. The edges of the wound being retracted to expose the ribs an incision is next made through the periosteum along the course of each rib for the required distance, the periosteum separated with a raspatory from both the outer and inner surface, and the rib then cut through with the saw or bone forceps at each end of the incision, the soft parts being protected by a spatula passed beneath the rib. If the pleura is greatly thickened a portion of the parietal layer may be cut away, after applying ligatures, and the visceral layer then scraped, so that it may adhere to the skin and muscles in the flaps (*Schede's operation*). If the lung is bound down by the greatly thickened visceral pleura this may be dissected off so as to allow the lung to expand *(pulmonary decortication)*. One may also try to draw a collapsed lung forward and to fix it by sutures to the parietal pleura along the upper margin of the wound. It is wise not to do too much on one occasion, but to await the result of the falling-in of the chest-wall to meet the lung." (Walsham's *Surgery*.)

5. "*Perineal prostatectomy* consists of a partial or complete extirpation of the gland through a perineal incision. This operation as modified by Alexander consists of making a small suprapubic incision. The patient is then placed in the lithotomy position, a tunneled sound passed, and the urethra opened on the convexity of the instrument, the sound is then withdrawn and the gland pressed down in the perineal wound, through the suprapubic opening. The capsule of the prostate is opened at its apex and the gland enucleated, first removing each of the lateral lobes and the median portion. The bladder is then drained above and below through both incisions. This operation may be done without the suprapubic cystotomy by which good results are often obtained.

Suprapubic prostatectomy is a favorite operation among many surgeons who claim better results from this operation than any other method. The advantages claimed are that the growth can be seen, the access to the gland is better, and therefore hemorrhage more easily controlled and calculi easily removed, if the occasion presents itself. The operation is as follows: Suprapubic cystotomy is performed and the bladder sutured to the parietal incision, the prostate is then inspected and the projecting overgrowth removed. Incisions are made into the mucous membrane of the bladder and the portions of the gland enucleated by blunt dissection. The hemorrhage can then be controlled by hot irrigations and packing and a drainage tube inserted through the suprapubic opening."—(Hirsch's *Genitourinary Diseases*.)

6. *Inguinal colostomy.* "Its chief advantages over the lumbar operation are: (1) That there is less difficulty in finding the gut; (2) that there is less danger of fecal extravasation causing peritonitis, in that proper precautions can be taken; and there is less risk of infiltration of the tissues and septic poisoning; and (3) that the groin is a more convenient situation for the formation of an artificial anus than the loin. An oblique incision about two inches long is made one inch from the anterior superior iliac spine at right angles to a line drawn from the umbilicus to the iliac spine, one inch of the incision being below and one inch above the line. Divide the skin, superficial and deep fascia, aponeurosis, muscles, fascia transversalis, and peritoneum, or better, after the division of the aponeurosis, separate the fibers of the muscles with anatomy forceps. If the gut does not present in the wound search for it at the junction of the iliac and lumbar fossæ. Having found the colon, draw it down until the mesocolon is taut, so as to avoid prolapse of the bowel subsequent to the operation. Bring a small loop of the bowel well out of the wound, pass a piece of glass rod or a pair of clamp forceps beneath it through the mesocolon so as to produce a good spur and thus prevent the fæces going down the distal end of the intestine. Unless a large wound has been made sutures are generally not wanted. Apply an antiseptic dressing with a piece of protective next the bowel to prevent its adhering to the gauze, and at the end of from one to five days, when adhesions have had time to form, cautiously open the gut by cutting into it with the actual cautery. When sutures are employed and especially if the peritoneum contains fluid the adhesions between the bowel and parietes are apt to be impaired, and the gut may suddenly slip back into the peritoneal cavity. To prevent this untoward event the rod should be kept *in situ* for ten days or longer. Meanwhile portions of the loop may be cut away with the cautery. Finally, with the patient under gas or morphine, the gut is divided down to the rod. This must be done slowly with the cautery only a dull red, or the mesenteric vessels will bleed and require ligaturing."—(Spencer and Gask.)

Indications: Chronic obstruction of lower colon, carcinoma of rectum or sigmoid flexure, syphilitic or other ulceration of rectum, volvulus of sigmoid flexure, some cases of recto-vesical or recto-vaginal fistula.

SURGERY OTHER THAN OPERATIVE.

1. *Septicemia* is an acute general infection arising from the presence of pyogenic organisms in the blood. The *Streptococcus pyogenes* is the usual organism present, and it manufactures its toxins in the blood-stream. Infection

occurs through a prick, scratch, or abrasion, or through an operation wound. A surgeon may infect himself through a prick from a needle in an operation for septic peritonitis. It may arise during the course of cellulitis or any of the varieties of gangrene. *Symptoms:* A rigor is often the earliest symptoms, followed by a rise of temperature to 104° F., which remains constant. The pulse is increasingly rapid, and becomes weak; there is loss of appetite, dry, brown tongue, and constipation at first. Diarrhea, which may be blood-stained, comes on later, while the urine contains albumin. The temperature may become subnormal, but if the pulse still remains rapid it is a very bad sign. *Diagnosis:* From sapræmia, or traumatic fever, it is known by the fact that opening up and draining the wound makes no difference to the condition, whereas in sapræmia the patient gets rapidly better. From pyæmia, by the fact that there are neither repeated rigors nor secondary abscesses. *Treatment* The focus of infection must be dealt with either by free incisions or amputation, but once the organisms reach the circulation this cannot be expected to do much good. Good food, stimulants and quinine must be given. Antistreptococcic serum should be tried, 10 c.c. every four hours. Intravenous injections of large quantities of saline solution frequently, to produce diuresis and diarrhea, with the hope of washing out the cocci and their products, may be tried.

Pyemia is an infective disease characterized by rigors, marked intermittent fever, and the devlopment of secondary abscesses. The organisms present are either staphylococci or streptococci. The *cause* is any condition which leads to the formation and detachment of intective emboli in the circulation. An infective embolus lodges in some vessel which is too small to allow it to pass—the lung, if it is from a systemic vein, the liver if from one of the portal system. A thrombus forms upon it, and the organisms set up a secondary abscess. In the lungs these form wedge-shaped areas, with the base to the surface of the lung, and are called infarcts. Similar emboli may lodge and form abscesses in any of the organs, serous membranes, joints, etc. If the primary focus is in the portal area, and the emboli are first lodged in the liver, the condition is called *pylephlebitis*. The general symptoms if very severe are due to septicæmia in addition to the pyæmia. *Symptoms:* Severe rigors repeated at intervals of one to two days. The rigors last twenty to forty minutes; the temperature rises to 103° or 104° F. and remains so for about an hour, then falls rapidly, accompanied by profuse sweating. The patient often becomes jaundiced, and signs of abscesses in the lungs, joints, etc., become apparent. The pulse becomes rapid and weak, the appetite is bad, and delirium fol-

lows. Infective endocarditis may occur. The secondary abscesses appear at the end of the first week, and form very rapidly. There is no barrier of granulation tissue enclosing them. Acute cases die in eight or ten days; chronic cases may go on for many months and completely recover. *Diagnosis:* No mistake can be made when a focus of infection is apparent. If such cannot be found, it may be mistaken for malaria. *Treatment:* Local—As most cases are due to septic phlebitis, the vessel should be ligatured nearer to the heart, to prevent further invasion of the blood stream. This is done in the internal jugular vein for lateral sinus pyæmia. Sometimes amputation is necessary to get above the lesion. The secondary abscesses, if practicable, should be opend, flushed out, and drained. Joints distended with pus may recover with free mobility under early treatment. *General treatment* consists of good feeding, stimulants, quinine, and antistreptococcic serum.—(*Aids to Surgery.*)

2. *Tetanus* is an infective disease of wounds due to *bacillus tetani.* Exciting cause is the *bacillus tetani* entering a wound. Predisposing causes are occupations where a person is in contact with earth, going barefoot, carelessness when exposed to rusty nails, dirty implements, etc. Tetanus generally begins with malaise, then in 5 to 15 days after infection the muscles of the neck and of mastication contract firmly, the muscles of the trunk follow, and last of all the respiratory muscles. The spasm is never entirely relaxed, yet the least stimulus such as a noise or draught causes violent tonic contractions. Rapid pulse and dysphagia are present. Consciousness is unimpaired. It is diagnosed from hydrophobia by the fact that in this latter the convulsions are never tonic, and from strychnine poisoning by the fact that in this latter there is complete relaxation between the spasms. *Treatment:* Prevention by careful antiseptic treatment of all wounds. The infecting wound should be freely exercised and purified. Amputation is unnecessary, unless it be a finger or a very septic compound fracture of a limb. Antitetanic serum, which is the serum of an immunized horse, should be injected in doses of 20 c.c. every twelve to twenty-four hours till symptoms cease. Unfortunately, the serum only prevents the further development of the organisms, but is unable to combat the tetano-toxin already absorbed. Injection of anti-tetanic serum into the brain itself is practised, but the results are not more favorable. General measures consist in keeping the patient in a quiet, darkened room. Fluids should be given by the nasal tube if trismus is marked. Chloral should be given in doses of 20 grains every two or four hours, and chloroform administered during the severe

convulsions. Chloral and chloroform are only palliative remedies; there are no drugs yet known which can cure tetanus.

3. *Osteomyelitis* is inflammation of the bone and marrow; the term is often used now for inflammation of bone It is *caused* by infection, the bacteria gaining entrance either through a wound or by extension from neighboring tissues, or they may be brought by the blood. *Symptoms:* Sudden onset; pain, tenderness, fever, chills, swelling of soft parts; sometimes the joint can be moved gently without pain; septicemia or pyemia, may be present. It is to be *diagnosed* from (1) *Rheumatism,* in which more than one joint is affected and the tenderness is in the joint, and not near it. (2) Tubercular arthritis, in which the onset is slow and the trouble starts in the epiphysis rather than in the diaphysis. (3) Cellulitis, in which the bone and periosteum are not affected, and in which there is always a wound. In *osteomyelitis,* the *treatment* consists in relieving the constitutional symptoms and preventing the bone from necrosing. An incision down to the bone is made; if pus is beneath the periosteum, the latter is also incised; a piece of bone is removed by chisel or trephine, pus is removed, the endosteum is hurt as little as possible, the wound is irrigated with hot bichloride solution and packed with gauze; the soft parts are closed and the wound well drained. In case this fails, amputation may be necessary.

4. An *aneurysm* is a pulsating sac containing blood, and communicating with the lumen of an artery. In the first instance the sac is formed by one or more of the arterial coats, but as it increases in size the sac is solely formed of the condensed cellular tissue around. Soon the endothelial lining disappears, and fibrin becomes deposited around the walls of the cavity in a laminated manner. Often there are alternate layers of red and white clot.

"*Popliteal aneurysm* is the most common surgical aneurysm, and is not infrequently met with in both limbs. It is generally due to disease of the artery, although repeated slight strains, which are so liable to occur at the knee, may play an important part in determining its formation. The aneurysm is usually sacculated, and may spring from the front or from the back of the vessel. It may exert pressure on the bones and ligaments of the joint, and it has been known to open into the articulation. The pain, stiffness, and effusion into the joint which accompany these changes often lead to an erroneous diagnosis of joint disease. The sac may press upon the popliteal artery or vein, causing congestion and œdema of the leg, and leading to gangrene. Pressure on the popliteal nerves gives rise to severe pain, muscular cramp, and weakness of the leg. The differential diagnosis is to be made from abscess, bursal

cyst, enlarged glands, and sarcoma. The choice of operation lies between ligation of the femoral artery in Hunter's canal, enucleation of the sac, and Matas' operation of aneurysmo-arteriorraphy."—(Thomson and Miles' *Surgery.*)

5. *When a fracture involves a joint,* the difficulties of treatment are necessarily much increased, as the task set for the surgeon is to immobilize sufficiently to secure consolidation of the fracture in good position and yet prevent ankylosis of the joint. In such injuries the joint capsule is usually distended with effused blood, whose removal is effected either by aspiration or by a dressing that will exercise compression and favor absorption. Dressings must be changed frequently, massage and passive movements being practised almost from the first, and active movements being early encouraged. Such treatment entails much labor upon the surgeon, but consolidation, with good mobility, may result.—Gould and Pyle's *Cyclopedia.*)

Colles' fracture is due to falls on the outstretched palm. "The line of fracture is about an inch above the wrist, which runs obliquely downwards from behind. The lower fragment is driven backwards and upwards, and rotated to the radial side, carrying the hand with it into the position of abduction, and leaving the tip of the radius at the same level as, or higher than, the tip of the styloid process of the ulna. The internal lateral ligament of the wrist is ruptured or the styloid proces torn off. The fracture is usually impacted, the upper fragment being driven into the lower. The deformity is characteristic, viz.: (1) the hand is abducted; (2) the styloid process is on the same level as, or lower than, the tip of the radius; (3) the upper end of the lower fragment projects above the back of the wrist; on the front is a corresponding depression, while above it the upper fragment projects forwards. Union occurs readily, but it is common to get deformity and adhesions about the site of fracture. *Treatment:* Disimpaction and reduction are brought about by grasping the hand by the 'shaking-hands' grip, extending and abducting the hand and lower fragment. The arm is then fixed on a Carr's splint or by Gooch splinting. It is very important in this fracture to start massage and passive movement not later than the end of the first week, to prevent stiffness. Union is firm in three weeks."—(*Aids to Surgery.*)

6. *Hypertrophy of the prostate* is very common in patients over fifty-five. The different varieties are: (1) General enlargement of all the tissues; (2) local enlargement, giving rise to definite tumors in the gland, which may be glandular (adenoma) or fibromyomatous. These tumors may project toward the rectum, into the urethra, or up into the bladder. The prostatic urethra is always

lengthened and distorted, so that micturition is interfered with. If the median lobe is enlarged the internal urinary meatus is more or less blocked. *Symptoms* begin with frequency of micturition, then some difficulty in the act of micturition, with diminution in the power of projection. Some pain and tenesmus occur later. Secondary changes in the bladder depend on the amount of obstruction. Hypertrophy and sacculation come on, and are followed by atrophy and dilatation. Dilatation of the ureters and hydronephrosis are produced still later. As atrophy of the bladder comes on a certain amount of residual urine remains after each act of micturition. As this increases distention and atony are found with overflow incontinence. Cystitis soon comes on, and may be followed by septic changes in the kidney. The early changes may be unnoticed till overflow incontinence appears. Priapism may occur in the early stages. The *diagnosis* is made by a consideration of the symptoms and physical examination. The gland may be felt to be enlarged from the rectum, but there may be marked prostatic obstruction with little posterior enlargement. The length and direction of the urethra are measured by a coudé catheter, and the amount of residual urine is noted. The *complications* which occur are retention, cystitis, calculi, hematuria, urethritis, and prostatic abscess. *Treatment* is palliative or operative. *Palliative* measures consist in attention to the general health and avoidance of alcohol, exposure to cold, and excessive exercise. If there is any residual urine the bladder must be emptied regularly by a catheter, either coudé, bicoudé, or silver prostatic, taking great care that the instrument is always aseptic.—(*Aids to Surgery.*)

MEDICAL AND SURGICAL ANATOMY.

1. (*a*) The ***middle meningeal artery*** crosses the anterior inferior angle of the parietal bone at a point 1½ inches behind the external angular process of the frontal bone, and the same distance above the zygoma. From this point the anterior branch passes upward and somewhat backward toward the sagittal suture, lying a little over half an inch behind the coronal suture. The posterior branch passes upward and backward over the squamous portion of the temporal bone.

(*b*) To *locate the fissure of Rolando on the scalp*: Draw a straight line over the top of the scalp from the inion to the glabella; bisect this line, and half an inch posterior to the midpoint draw a line downward and forward at an angle of 67.5° for a distance of 3½ inches. This line will represent the location of the *fissure of Rolando.*

(*c*) The course of the *lateral sinus* is represented by a line drawn from the external occipital protuberance to the

base of the mastoid process, and another line from the base of the mastoid to its tip.

2. The *reflex center* for the *bladder,* in the lumbar enlargement of the spinal cord; for the *rectum,* in the lumbar enlargement of the spinal cord; for *ankleclonus,* in the anterior horns of the third to fifth sacral segment of the spinal cord; for *knee jerk,* in the anterior horns of the second to fourth lumbar segments of the spinal cord; for *wrist jerk,* in the anterior horns of the sixth to eighth cervical segment of the spinal cord; for *elbow jerk,* in the anterior horns of the sixth cervical segment of the spinal cord.

3. The *parts entering into the formation of the wrist joints are:* The lower end of the radius, the under surface of the interarticular fibrocartilage, and the scaphoid semilunar and cuneiform bones; cartilage, anterior, posterior, external lateral, and internal lateral ligaments, and synovial membrane.

4. *Colles' fracture* is a fracture of the lower end of the radius; it is generally transverse, and is usually within an inch or an inch and a half of the articular surface. There is a characteristic deformity caused by the lower fragment, and the carpus forming a prominence on the dorsal surface; at the same time there is a projection on the palmar surface just above the wrist, caused by the upper fragment. The hand is abducted and pronated, and the styloid process of the ulna becomes very prominent.

Pott's fracture consists of a fracture of the lower end of the fibula, about three inches above the tip of the malleolus; and a fracture of the internal malleolus. The foot is twisted outward, the sole everted, and the heel drawn up; there is a depression at the site of the fracture, the inner malleolus either projects prominently or the fragment can be felt and crepitus elicited; the foot is shortened and the ankle is swollen and widened.

5. By a digital examination of the rectum there can be made out: The external sphincter, the internal sphincter, the rectal insertion of the levatores ani, the anal canal, the condition of the ischiorectal fossæ, the coccyx, hollow of sacrum, lower part of sacrum, tuberosity of ischium, wall of pelvis, great sacrosciatic ligament. In addition, in the *male*: The membranous urethra, the prostate, vasa deferentia, seminal vesicles, distended bladder. In the *female*: Perineal body, rectovaginal septum, os uteri, cervix uteri, ovaries.

6. In the nulliparous adult the uterus is about three inches long, about two inches wide at the upper part, and about one inch thick. The uterus lies between the rectum behind and the bladder in front; it is below the abdominal cavity, and above the vagina. Its position is one of slight

anteflexion, with its long axis at right angles to the long axis of the vagina. The anterior surface of its body rests on the bladder, and the cervix points backward toward the coccyx. The uterus is not fixed, but moves freely within certain limits. It is held in place by ligaments—broad ligaments, round ligaments, vesicouterine, and rectouterine.

The *Fallopian tubes* are about four and a half inches long, and each one opens at one end into the pelvic cavity near the ovary, and at the other end into the upper lateral part of the uterine cavity. The tube is enclosed in a fold of peritoneum which is a portion of the broad ligament of the uterus.

The *ovary* is about the size and shape of an almond, about an inch and a half long, and a quarter of an inch thick. It is situated against the side wall of the pelvic cavity and is connected by peritoneal folds with the lateral wall of the pelvis and with the broad ligament of the uterus.

7. The parts cut through in amputation at the upper third of the leg are: Skin; fascia; bones, tibia, and fibula; interosseous membrane; muscles, tibialis anticus, tibialis posticus, extensor longus digitorum, extensor proprius hallucis, flexor longus hallucis, flexor longus digitorum, peroneus longus, peroneus brevis, soleus, gastrocnemius, and the tendon of the plantaris; arteries, anterior tibial, posterior tibial, peroneal; veins, the venæ comites of the arteries, external saphenous, internal saphenous; nerves, anterior tibial, posterior tibial, external saphenous, communicans peronei, musculocutaneous.

The main vessels tied are: The anterior tibial, in front of the interosseous membrane; the posterior tibial, beneath the deep transverse fascia and behind the tibia; the peroneal, beneath the deep transverse fascia and behind the fibula.

8. In the *right inguinal* region may be found: Ovarian tumors, pelvic abscesses, diseases of the cecum and appendix, fecal impaction, hernia.

In the *left inguinal* region may be found: Tumor of the sigmoid, ovarian tumors, pelvic abscesses, volvulus, fecal impaction, hernia.

In the *hypogastric* region may be found: Distended bladder, uterine tumors and cysts, pregnant uterus.

9. *Scarpa's triangle* is a triangular area or depression situated just below the fold of the groin. It is bounded *above* by Poupart's ligament, *externally* by the Sartorius, and *internally* by the inner margin of the Adductor longus; its *apex* is formed by the junction of the Adductor longus and Sartorius. The *floor* is formed, from without inward, by the Iliacus, Psoas, Pectineus, Adductor brevis, and Adductor longus. *Contents*: The femoral vessels pass from

about the center of the base to the apex, the artery being on the outer side of the vein; the artery gives off the superficial and profunda branches, and the vein receives the deep femoral and internal saphenous; the anterior crural nerve lies to the outer side of the femoral artery; the external cutaneous nerve is still further external, lying in the outer corner of the space; just to the outer side of the femoral artery, and in the sheath with it, is the crural branch of the genitocrural nerve. At the apex, the vein (which at the base was internal to the artery) lies behind the artery. The triangle also contains fat and lymphatics. Its *surgical importance* is due to the number of important structures which it contains (see above). Its apex is the point for ligating the femoral artery; digital pressure, or ligation, is applied here in case of popliteal aneurysm; femoral hernia appears in the upper part, and psoas abscess often points here, too.

10. The collateral circulation after ligature of the femoral artery in Hunter's canal: (1) The external circumflex; with the lower muscular branches of the femoral, anastomotica magna, superior articular of the popliteal, and anterior tibial recurrent. (2) The perforating and terminating branches of the profunda; with muscular branches of the femoral, and muscular and superior articular branches of the popliteal. (3) The comes nervi ischiadici; with the perforating branches of the profunda, and the articular branch of the popliteal.

MEDICAL JURISPRUDENCE.

1. Avoid injuring the pericardium or other intrathoracic tissues.

2. The presence or absence of dilatation or aneurysm.

3. "Grasp the heart by the base and turn it up to expose the posterior surface, estimate by the eye a line midway between the anterior and posterior coronary arteries and along this cut into the left ventricle from the base to the apex with one long sweep of the knife; open the right ventricle by a similar cut midway between the posterior coronary and the right (really the inferior) margin of the heart, the space being usually quite free from fat; as the left ventricle is opened insert the index finger of the left hand, put the thumb into the other cut—between the two is the septum—and with that hold the heart is easily managed in the further cutting; avoid pressing the septum between thumb and finger. Lift the organ straight up and cut the stretched vena cava inferior as long as possible just as it enters the pericardium; swing the heart to the right side and cut the pulmonary veins on the other, reverse and cut the remaining pulmonary veins and superior cava; only the aorta holds it now and that is cut from below upward

as the heart is lifted and carried toward the chin; if the knife is sharp and clean long cuts are made, two or three are enough and there is no spattering of blood."—(Thayer's *Pathology.*)

4. Death by suffocation is due to asphyxia; that is, air cannot get to the blood, and eventually the respiratory center becomes paralyzed by the prolonged action of the increasingly venous blood.

5. The average weight in an adult of the *brain* is: male, 49½ ounces; female, 44 ounces. *Heart,* male, 10 to 12 ounces; female, 8 to 10 ounces. *Spleen,* about 7 ounces. *Liver,* male, 50 to 60 ounces; female, 40 to 50 ounces. *Kidney,* male, 4½ to 6 ounces; female, 4 to 5½ ounces.

TOXICOLOGY AND MENTAL DISEASES.

6. COCAINE POISONING. (*a*) *Symptoms:* "When a large dose has been taken the symptoms are not unlike those of atropine poisoning. There is dryness of the throat, tongue, and nose, difficulty of swallowing, faintness, and sometimes nausea and vomiting. The pulse is usually increased in fullness and frequency at first. The respiration also becomes more rapid, and there is much general nervous excitement, with general hyperesthesia. The eyes are bright and staring and the pupils dilated. The patient talks volubly and incoherently. Sometimes an erythematous eruption appears on the skin. The stage of depression soon comes on, when the breathing becomes shallow, the heart's action more rapid, and the face pale or cyanotic. The surface becomes anesthetic, and muscular twitchings and paralysis precede death, which is generally caused by paralysis of respiration."

(*b*) *Period when fatal:*—Less than one hour. If the patient survive half an hour the prognosis is good.

(*c*) *Fatal quantity:*—15½ grains. The smallest fatal dose on record is 1.2 grain for an adult. Twelve drops of a 4 per cent. solution hypodermically caused the death of a girl eleven years of age in 40 seconds. Twenty-two grains by the mouth and 10 grains hypodermically have been recovered from.—(Riley's *Toxicology.*)

7. The *special indications of mental weakness* are:—Lack of attention, inability to concentrate the mind on one's work, loss of memory, incoherence, personal untidiness and neglect, hallucinations and illusions, lack of decision and will power, irritability of temper and disposition, insomnia.

8. In *opium poisoning* the pupils are contracted, respiration is slow, pulse slow and full, body temperature is normal or subnormal, there may be the odor of laudanum on the breath.

In *acute alcoholism* the patient can generally be aroused;

the coma is not, as a rule, complete; the face may be flushed; the pupils are normal or dilated; the respirations are normal in frequency, but deep; the skin is cool and moist, and the body temperature may be below normal; there may be the odor of alcohol on the breath.

In *epilepsy* there will be a brief aura, sudden and complete loss of consciousness, pupils dilated and rigid, the tongue will be bitten (unless prevented), the sphincters may be relaxed, there may be a slight rise of temperature.

In *cerebral hemorrhage*:—There are generally paralysis of the head and upper limbs; and in left-sided lesions there may be aphasia; the pulse is slow and full; the respirations are at first slow, regular, and stertorous, later on becoming of the Cheyne-Stokes type.

SANITARY SCIENCE.

1. (*a*) Of the rain that falls:—Part is evaporated; part flows off in streams and rivers; part sinks into the earth through cracks and fissures and flows toward some water channel or the sea; and part comes back to the surface again in the form of springs.

(*b*) The objections to using rain water as it falls are:—The rain takes up gases from the air (chiefly oxygen, nitrogen, and carbon dioxide), but also ammonia, nitrous and nitric acids; also suspended matters which may be floating in the air, such as soot. In this way impurities may be present to the extent of 2½ grains per gallon of water.

2. (*a*) The sources of water supply are: Rain and snow; (2) surface waters (rivers, lakes, and ponds); (3) subsoil or ground water; (4) deep waters (spring and artesian well).

(*b*) Three methods of purifying water:—Distillation, filtration, and boiling.

(*c*) Water stored in cisterns may become foul, it is stagnant, it absorbs impurities from the air, lead may be absorbed, and sewer gases or coal gases or filth may be drawn into the water.

(*d*) "A cistern should be placed at the top of the house, and fed by a supply-pipe controlled by a ball-cock. It must be large enough to contain at least a day's supply and must not directly supply the water-closet. It may be made of lead, lined with pitch or other protective coating, or of galvanized iron, or of slate slabs set in cement. It should be effectually covered, but ventilated, and provided with an overflow discharging into the open air away from any source of effluvia. Frequent inspection and cleansing are necessary."—(Whittegge and Newman's *Hygiene.*)

3. Diseases caused by the use of impure water are:—

Typhoid, cholera, dysentery, diarrhea, goitre, intestinal parasites, metallic poisoning, vesical calculi.

4. *Inspection of sewers* means a thorough testing of drains, pipes, and sewers. *Flushing* is regular and thorough washing out. *Ventilation* is a provision for the admission and discharge of air, to prevent pressure of air or gas being exercised upon the house-traps.

5. In *Cameron's septic tank* system "the sewage is first led into a tank from which air and light are excluded. Digestive changes take place in the sewage within this tank as the result of anaërobic bacterial action, which is favored by the darkness, the absence of air, and the perfect stillness at which the sewage is maintained. Under these circumstances much of the solid matter is rendered soluble and dissolved."—(Notter and Firth's *Hygiene.*)

6. Air is vitiated by:—The respiration of men and animals; the products of combustion and artificial lighting; substances yielded by factories, workshops, mines, sewers, marshes, cemeteries, etc.; organic products given off by human beings.

7. The advantages of a mountain climate, as contrasted with plains, are:—(1) Greater movement of air, strong winds; (2) less humidity; (3) more sunlight; (4) less suspended mattter in the air; (5) a lower temperature.

THERAPEUTICS.

1. *Belladonna is used:* "Locally, to relieve pain of all kinds; to relax spasm; to promote the resolution of enlarged glands; to check sweating, suppuration, and the secretion of milk; atropine is used extensively in ophthalmological practice. Internally, to check mercurial and other ptyalism; night-sweats of phthisis and other abnormal perspirations; serous diarrhea; intestinal, hepatic, and renal colic; to prevent the griping of purgatives; with opium in appendicitis or peritonitis; painful gastric affections; vomiting; sick-headache due to or accompanied by spasm of the arterioles; cardiac disease; shock and collapse; caseous pneumonia; acute coryza; whooping-cough and other spasmodic affections of the respiratory passages; mastitis; incontinence of urine; seminal emissions; vesical spasm; chordee, erysipelas; scarlatina when the rash is imperfectlv developed; the low, muttering delirium of typhoid and typhus fevers; certain forms of delirium tremens· sciatica and neuralgia; epilepsy. In many conditions atropine is most advantageously administered by hypodermatic injection and belladonna by suppository. The smoke of belladonna leaves is inhaled for asthmatic attacks."—(Wilcox's *Materia Medica.*)

Symptoms of poisoning by belladonna: "In the first stage. that of delirium, there are dryness of the throat, thirst,

difficulty of deglutition and spasms upon swallowing liquids, face at first pale, afterwards highly reddened, pulse extremely rapid, eyes prominent, brilliant, with widely dilated pupils, complete paralysis of accommodation, disturbances of vision, attacks of giddiness and vertigo, with severe headache, followed by delirium, occasionally silent or muttering, but usually violent, noisy, and destructive, accompanied by the most fantastic delusions and hallucinations. Usually the urine is retained, and the body temperature is above the normal. The delirium gradually subsides, and the second stage, that of coma, is established, with slow, stertorous respiration, and gradually failing pulse, until death occurs from respiratory or cardiac paralysis, or sometimes in an attack of syncope during apparent amelioration.

"*Treatment:* Lavage of the stomach; morphine may be given cautiously during the period of violent excitement. Maintain respiration; strong coffee by the mouth or rectum is beneficial. Pilocarpine may be given, in not too large doses, to stimulate the secretion of saliva."—(From Witthaus' *Essentials of Chemistry.*)

2. "The principles of treatment applicable to cases of ascites are: (*a*) to treat the conditions upon which the dropsy depends; (*b*) to promote absorption of the fluid; (*c*) to improve the general nutrition; (*d*) to remove the fluid by operation, if absorption cannot be effected; and (*e*) to treat any symptoms needing special attention. Absorption of ascitic fluid is often promoted by acting upon the bowels, skin, or kidneys. In ascites due to local causes, hydragogue and saline purgatives must, however, be administered with caution, and the strength of the patient maintained. In certain instances balsam or resin of copaiba has proved useful as a diuretic in the treatment of peritoneal dropsy. Assistance may be derived from the action of various diaphoretic baths upon the skin. Digitalis and squill may be of service as diuretics; the application of poultices of digitalis leaves over the abdomen is occasionally attended with benefit. The administration of iodide of potassium also seems to aid absorption in some cases, more especially if there be any tendency to syphilitic disease of the liver. It has been recommended to treat ascites merely by a diet of skimmed milk, without any medicine. The application of galvanism to the abdominal walls has been found efficacious in producing abscorption of peritoneal dropsy in a few instances. Treatment directed to the general condition of the patient, and to the state of the blood, is essential in many cases of ascites. Tonics are often of decided service, and preparations of iron are specially indicated for improving the quality of the blood, if there is a tendency to anemia. Not only do these remedies sustain

the patient, but they may also promote absorption. The diet should be nutritious and contain but little fluid."—(Quain's *Dictionary of Medicine.*)

3. *Digitalis* is used in mitral lesions; in valvular lesions which are made worse by slight exertion; in arterio-capillary fibrosis with cardiac changes; in irritable heart, due to nervous exhaustion. *Strophanthus* is used when digitalis upsets the stomach, and to relieve the palpitation and dyspnea in failing heart, due to nerve irritation.

Strychnine is used to give strength to the heart muscle.

Nitroglycerin is given in angina pectoris and arterio capillary fibrosis.

4. (*a*) For *pleurisy with effusion:*

℞. Emplastri capsici.....2x2 inches

Signa: Apply as directed.

(*b*) For *suppression of urine:*

℞. Triturationis elaterini .....gr. ss

Signa: Take at once.

(*c*) For *sciatica:*

℞. Linimenti chloroformi .....℥iv

Signa: Rub in well, along the course of the sciatic nerve, every three hours.

(*d*) For *alkaline cystitis:*

℞. Sodii benzoatis .....℥vj

Aquæ menthæ piperitæ.....℥iij. M.

Signa: Take one teaspoonful in water every three hours.

DISEASES OF WOMEN.

1. "The wound should be sutured at once and the urine which has escaped into the peritoneal cavity removed with a gauze sponge. Normal urine causes no irritation of the peritoneum, but if cystitis is present the urinary secretions are likely to produce infection and endanger the life of the patient. If the wound has been properly sutured there is no danger of subsequent leakage and drainage is therefore not indicated. It may be necessary if the tear is large to catheterize the patient every three or four hours for the first day after operation, and then every six hours for the next two days in order to avoid distention and undue strain upon the sutures. A permanent catheter should not be employed, as it is seldom indicated and may cause cystitis. *Operation:* A vesical tear involving only the outer coats of the bladder should be closed by a continuous Lembert suture of No. 2 braided silk, which is carried upon a curved intestinal needle, and passed deep enough to include the torn structures. A deep tear involving all the coats and opening the cavity of the bladder should be closed by two tiers or layers of sutures as follows: The first layer approximates the edges of the wound and the second tier reinforces and buries these sutures,

thus guarding against the possibility of leakage. The approximation layer consists of a continuous suture of cumol catgut (No. 1), which is carried upon a curved intestinal needle and passed through all the coats of the bladder except the mucous membrane. The reinforcing tier consists of a continuous Lembert suture of No. 2 braided silk which is also carried upon a curved needle and passed through the peritoneum and the superficial portion of the muscular coat of the bladder."—(Ashton's *Gynecology.*)

2. Pruritus vulvæ may be *caused by:* Parasites; diseases of the vulva, as inflammation, edema, vegetations, congestion; irritating discharges; lack of cleanliness; diabetic urine; it may also be of nervous origin, or idiopathic.

Treatment consists in removing the cause, if possible; cleanliness, fresh air, tonics, and general attention to hygiene; local applications of solution of bichloride of mercury, 1 : 2,000; or carbolic acid, 1 : 100; or lead and opium; dusting powders of bismuth subnitrate, calomel, or zinc oxide are also useful.

3. "In the *operation for complete laceration* the rectovaginal septum is split laterally, thus separating the vagina from the rectum for a short distance and thoroughly exposing the ends of the sphincter ani. The wound in the rectum is then closed by two layers of chromicized catgut sutures, one for the mucous membrane and a second for the outer coats. The sphincter ani is approximated by two or three additional catgut sutures. The operation is then completed as Emmet's, the lowest external suture being passed through the sphincter ani. Emmet's operation is as follows:

"With the patient in the lithotomy position, guide sutures or tenacula are passed through the apex of the retocele, and through each labium majus at the lowest caruncula myrtiformis. By drawing on the lateral suture and pulling the central suture downward and to the opposite side, the lateral sulcus appears as a triangle with the apex up in the vagina. This triangle is denuded of mucous membrane by cutting off long strips by means of forceps and scissors, or by dissecting the mucous membrane off in one piece. The triangle on the opposite side is treated in the same manner, and the denudation completed by removing the mucous membrane between the bases of the triangles and below the central suture. Each lateral triangle is closed by interrupted sutures of chromicized catgut or silkworm gut, the latter being shotted. The needle, which should be curved, is entered near the margin of the wound on the outer side, passed deeply to catch the fibers of the levator ani, and brought out at the bottom of the sulcus, at a point nearer the operator; it is then reinserted

at the bottom of the sulcus, and passed upwards and backwards in the rectocele, to emerge opposite the point of the original insertion. The opposite triangle is treated in the same manner, which leaves a small raw area externally to be closed. The upper or "crown stitch" passes through the skin of the perineum below the lateral guide suture, then through the rectocele below the central guide suture, and finally through the tissues below the opposite guide stitch. As many sutures as may be necessary are inserted below this. If silkworm gut is used, the stitches should be removed on the tenth day. The external genitals are irrigated with weak bichlorid of mercury solution after each urination. Internal douches are not needed unless there be infection."—(Stewart's *Surgery.*)

4. In the *retrodisplaced uterus,* the fundus of the uterus is not found in its proper place, in the other conditions the fundus would be against the bladder. In the *ovarian cyst,* vaginal examination (with the help of a sound) would show that the tumor was not connected with the uterus. In the case of a *fibroid,* there would probably be a uterine hemorrhage.

5. (*a*) Preliminary preparation includes all the usual antiseptic and aseptic precautions.

(*b*) The *uses* of the uterine sound are:—(1) To demonstrate the mobility of the uterus; (2) to show the size of the uterus; (3) the presence of intrauterine growths; (4) deviations in the cervical canal, and (5) as an aid in the diagnosis of uterine displacements.

(*c*) *Contraindications*:—(1) The least suspicion of even the possibility of pregnancy; (2) menstruation; (3) acute endometritis; (4) malignant disease of the uterus or vagina; (5) acute pelvic inflammation.

(*d*) *Dangers*:—(1) Abortion; (2) sepsis; (3) peritonitis; (4) hemorrhage; (5) perforation of the uterus.

DISEASES OF CHILDREN.

1. *Laryngysmus stridulus* is a spasmodic disease of the larynx occurring in infants and young children, consisting of a temporary closure of the rima glottidis, causing great dyspnea, and other symptoms dependent on temporary suffocation. *Predisposing causes* are malnutrition brought about by imperfect feeding; syphilis, rickets, enlarged tonsils, and the tubercular diathesis. The *exciting causes* are reflex nervous disturbances, brought about by intestinal irritation, worms, teething, exposure to cold, overloading the stomach, frights and "starts."

Symptoms: Sometimes a slight cold *precedes the attack* (catarrhal form), but often the child is apparently well on going to bed, and wakes up suddenly at night with a brassy croupy cough and dyspnea. The spasm is usually worse

on first awaking. After a time the spasm passes off and the child, beyond having a slight croupy cough for a day or two, seems none the worse. It might be mistaken for catarrhal laryngitis and croup (diphtheria).

The *treatment* consists in attempting to excite inspiration reflexly by dashing cold water in the face, fanning, hooking back the epiglottis with the forefinger, etc. Intubation or tracheotomy may be required. Chloral, bromides, and minute doses of opium may be given. During the interval the rachitic condition should receive treatment.

2. *Kernig's reflex* (or sign) is present in meningitis or cerebrospinal fever in nearly every case. It is very rarely present in other conditions, hence it is a sign of much value.

Babinski's reflex is said to indicate disease of the pyramidal tract, except in children under two years of age, when the reflex is normal. Its absence does not prove that the pyramidal tracts are not diseased. There is still much uncertainty as to the value of this reflex, its chief value being in differentiating organic disease of the lateral columns from so-called "functional" conditions.

In *lobar pneumonia*, if the toxic condition is very severe, the patellar reflex may be exaggerated.

3. There may be pain, dyspnea, fever up to 101° or 102°; quick and small pulse, and the cardiac murmur, which is generally systolic and heard best at the apex; there may be palpitation; anemia is often present. *Treatment:* Absolute rest in bed, avoidance of excitement, light diet, especially milk and broths. Calomel in divided doses may be given. Sodium salicylate, leeches, Dover's powder, and digitalis are all used. Excessive exercises must be forbidden.

4. *Acute osteomyelitis.* (*a*) The three most common infecting germs are: *Staphylococcus pyogenes aureus, Staphylococcus pyogenes albus,* and *Streptococcus pyogenes.*

(*b*) The three bones most frequently affected: Femur, tibia, and humerus (or radius).

(*c*) Diseases for which it may be mistaken: Rheumatism, gonorrheal rheumatism, typhoid fever, tuberculous arthritis, cellulitis, and infantile scurvy.

Treatment is immediate incision down through the periosteum; the surface of the bone must be opened with gouge or chisel, pus evacuated, and drainage instituted; irrigation with hot bichloride solution and packing with gauze. The medulla of the bone must be freely exposed, and any suppurating material removed. Constitutional treatment and rest, are, of course, indicated.

5. The structures that would be pierced, are: Skin, subcutaneous fascia, epicranial aponeurosis, superficial temporal aponeurosis, deep temporal aponeurosis, temporal muscle, periosteum, squamous portion of temporal bone, dura, arachnoid, pia, and third temporal convolution of cerebrum.

Symptoms and treatment: Severe concussion may follow, or inflammation. The patient was probably unconscious, with faint respirations, weak pulse, skin pale and cold; headache and irritability would probably remain, and some impairment of hearing or memory. *Treatment:* Absolute rest, and warmth to body; light diet and laxatives; do not interfere with the brain unless symptoms of sepsis present themselves.

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